FORM PTO-1390 (REV. 12-2001) U S DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER: Mo7057/LeA 34,002

U.S APPLICATION NO. (If known, see 37 CFR 1.5): 10/089989 To be Assigned

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP00/09323	25 September 2000 (25.09.00)	07 October 1999 (7.10.99)

TITLE OF INVENTION: Active Ingredient Combinations Having Insecticidal and Acaricidal Properties

APPLICANT(S) FOR DO/EO/US: FISCHER, Reiner and ERDELEN, Christoph

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. [X] This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. [ ] This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. [X] This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. [X] The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. [X] A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. [X] is attached hereto (required only if not communicated by the International Bureau).
   b. [ ] has been communicated by the International Bureau.
   c. [ ] is not required, as the application was filed in the United States Receiving Office (RO/US).
6. [X] An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. [X] is attached hereto.
   b. [ ] has been previously submitted under 35 U.S.C. 154(d)(4).
7. [ ] Amendments to the claims of the International Aplication under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. [ ] are attached hereto (required only if not communicated by the International Bureau).
   b. [ ] have been communicated by the International Bureau.
   c. [ ] have not been made; however, the time limit for making such amendments has NOT expired.
   d. [ ] have not been made and will not be made.
8. [ ] An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).
9. [X] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. [ ] An English lanugage translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. [ ] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. [X] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. [X] A FIRST preliminary amendment.
14. [ ] A SECOND or SUBSEQUENT preliminary amendment.
15. [ ] A substitute specification.
16. [ ] A change of power of attorney and/or address letter.
17. [ ] A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. [ ] A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. [ ] A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. [X] Other items or information:

Abstract page

U.S. APPLICATION NO (if known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO	ATTORNEY'S DOCKET NUMBER
To be Assigned 10/089989	PCT/EP00/09323	Mo7057/LeA 34,002

21. [X] The following fees are submitted:	CALCULATIONS PTO USE ONLY	
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1)-(5)):		
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO **$1040.00**		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO **$890.00**		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO **$740.00**		
International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) **$710.00**		
International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) **$100.00**		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 890.00	
Surcharge of **$130.00** for furnishing the oath or declaration later than [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	7 - 20 =	0	x **$18.00**	$
Independent claims	2 - 3 =	0	x **$84.00**	$
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ **$280.00**	$ 280.00

TOTAL OF ABOVE CALCULATIONS =	$ 1170.00	
[ ] Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2. +	$	
SUBTOTAL =	$	
Processing fee of **$130.00** for furnishing the English translation later than [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(f)).	$	
TOTAL NATIONAL FEE =	$ 1170.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property +	$ 40.00	
TOTAL FEES ENCLOSED =	$ 1210.00	
	Amount to be refunded:	$
	charged:	$

a. [ ] A check in the amount of $ _____ to cover the above fees is enclosed.

b. [X] Please charge my Deposit Account No. 13-3848 in the amount of $ 1210.00 to cover the above fees. A duplicate copy of this sheet is enclosed.

c. [X] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 13-3848 A duplicate copy of this sheet is enclosed.

d. [ ] Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO.

00157
PATENT TRADEMARK OFFICE

Raymond J. Harmuth
SIGNATURE

Raymond J. Harmuth
NAME

33,896
REGISTRATION NUMBER

PATENT APPLICATION
Mo-7057
LeA 34,002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION OF)
)
REINER FISCHER ET AL)
) PCT/EP00/09323
SERIAL NUMBER: TO BE ASSIGNED)
)
FILED: HEREWITH)
)
TITLE: ACTIVE INGREDIENT)
COMBINATIONS HAVING)
INSECTICIDAL AND ACARICIDAL)
PROPERTIES)

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231
Sir:

Upon the granting of a serial number and filing date and prior to the examination of the subject application, kindly amend the application as follows:

"Express Mail" mailing label number ET671452345US
Date of Deposit April 2, 2002

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Assistant Commissioner of Patents and Trademarks, Washington, D.C. 20231

Donna J. Veatch
(Name of person mailing paper or fee)

Signature of person mailing paper or fee)

IN THE SPECIFICATION:

Please amend the Title on page 1 and the Abstract page as follows:

--ACTIVE INGREDIENT COMBINATIONS HAVING INSECTICIDAL AND ACARICIDAL PROPERTIES--.

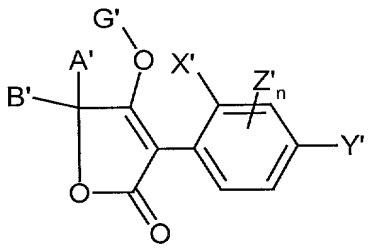
A new Abstract page is included herewith.

IN THE CLAIMS:

Please cancel Claim 5 and amend the claims as follows. A marked up copy of the claims to show changes is attached to this Preliminary Amendment.

1. (Once Amended) A composition, comprising a synergistically effective mixture of:

a) a cyclic ketoenol compound of the Formula (I)



(I)

in which

X' represents C_1-C_6-alkyl, halogen, C_1-C_6-alkoxy or C_1-C_3-halogenoalkyl,

Y' represents hydrogen, C_1-C_6-alkyl, halogen, C_1-C_6-alkoxy, C_1-C_3-halogenoalkyl,

Z' represents C_1-C_6-alkyl, halogen, C_1-C_6-alkoxy,

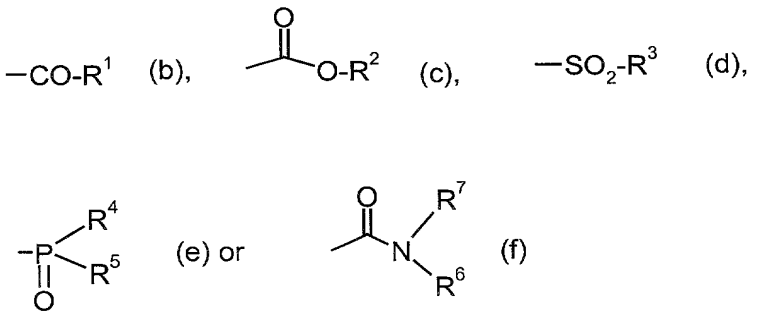
n represents a number from 0 to 3,

A' and B' are identical or different and each represents hydrogen or in each case optionally halogen-substituted straight-chain or branched C_1-C_{12}-alkyl, C_3-C_8-alkenyl, C_3-C_8-alkinyl, C_1-C_{10}-alkoxy-C_2-C_8-alkyl, C_1-C_8-polyalkoxy-C_2-C_8-alkyl, C_1-C_{10}-alkylthio-C_2-C_8-alkyl, cycloalkyl having 3-8 ring atoms which may be interrupted by oxygen and/or sulphur and in each case optionally halogen-, C_1-C_6-alkyl-, C_1-C_6-halogenoalkyl-, C_1-C_6-alkoxy-, C_1-C_6-halogenoalkoxy- and/or nitro-substituted phenyl or phenyl-C_1-C_6-alkyl,

or in which

A' and B' together with the carbon atom to which they are attached form a saturated or unsaturated 3- to 8-membered ring which is optionally interrupted by oxygen and/or sulphur and is optionally substituted by halogen, C_1-C_6-alkyl, C_1-C_6-alkoxy, C_1-C_4-halogenoalkyl, C_1-C_4-halogenoalkoxy, C_1-C_4-alkylthio or optionally substituted phenyl or is optionally benzo-fused,

G' represents hydrogen (a) or represents the groups



in which

R^1 represents in each case optionally halogen-substituted C_1-C_{20}-alkyl, C_2-C_{20}-alkenyl, C_1-C_8-alkoxy-C_2-C_8-alkyl, C_1-C_8-alkylthio-C_2-C_8-alkyl, C_1-C_8-polyalkoxy-C_2-C_8-alkyl or cycloalkyl having 3-8 ring members which may be interrupted by oxygen and/or sulphur atoms,

represents optionally halogen-, nitro-, C_1-C_6-alkyl-, C_1-C_6-alkoxy-, C_1-C_6-halogenoalkyl- and/or C_1-C_6-halogenoalkoxy-substituted phenyl;

represents optionally halogen-, C_1-C_6-alkyl-, C_1-C_6-alkoxy-, C_1-C_6-halogenoalkyl- and/or C_1-C_6-halogenoalkoxy-substituted phenyl-C_1-C_6-alkyl,

represents in each case optionally halogen- and/or C_1-C_6-alkyl-substituted pyridyl, pyrimidyl, thiazolyl and pyrazolyl,

or represents optionally halogen- and/or C_1-C_6-alkyl-substituted phenoxy-C_1-C_6-alkyl,

R^2 represents in each case optionally halogen-substituted C_1-C_{20}-alkyl, C_2-C_{20}-alkenyl, C_1-C_8-alkoxy-C_2-C_8-alkyl, C_1-C_8-polyalkoxy-C_2-C_8-alkyl,

represents in each case optionally halogen-, nitro-, C_1-C_6-alkyl, C_1-C_6-alkoxy- and/or C_1-C_6-halogenoalkyl-substituted phenyl or benzyl,

R^3, R^4 and R^5 independently of one another each represent in each case optionally halogen-substituted C_1-C_8-alkyl, C_1-C_8-alkoxy, C_1-C_8-alkylamino, di-(C_1-C_8)-alkylamino, C_1-C_8-alkylthio, C_2-C_5-alkenylthio, C_2-C_5-alkinylthio, C_3-C_7-cycloalkylthio, represent in each case

optionally halogen-, nitro-, cyano-, C_1-C_4-alkoxy-, C_1-C_4-halogenoalkoxy-, C_1-C_4-alkylthio-, C_1-C_4-halogenoalkylthio-, C_1-C_4-alkyl- and/or C_1-C_4-halogenoalkyl-substituted phenyl, phenoxy or phenylthio,

R^6 and R^7 independently of one another each represent in each case optionally halogen-substituted C_1-C_{20}-alkyl, C_1-C_{20}-alkoxy, C_2-C_8-alkenyl, C_1-C_{20}-alkoxy-C_1-C_{20}-alkyl, represent optionally halogen-, C_1-C_{20}-halogenoalkyl-, C_1-C_{20}-alkyl- or C_1-C_{20}-alkoxy-substituted phenyl, represent optionally halogen-, C_1-C_{20}-alkyl-, C_1-C_{20}-halogenoalkyl- or C_1-C_{20}-alkoxy-substituted benzyl or together represent a C_2-C_6-alkylene ring which is optionally interrupted by oxygen, and

b) a member selected from the group consisting of one or more agonists of nicotinic acetylcholine receptors, and one or more antagonists of nicotinic acetylcholine receptors.

2. (Once Amended) The composition according to Claim 1,

in which

X' represents C_1-C_4-alkyl, halogen, C_1-C_4-alkoxy or C_1-C_2-halogenoalkyl,

Y' represents hydrogen, C_1-C_4-alkyl, halogen, C_1-C_4-alkoxy, C_1-C_2-halogenoalkyl,

Z' represents C_1-C_4-alkyl, halogen, C_1-C_4-alkoxy,

n represents 0 or 1,

A' and B' together with the carbon atom to which they are attached form a saturated 5- to 6-membered ring which is optionally substituted by C_1-C_4-alkyl and/or C_1-C_4-alkoxy,

G' represents hydrogen (a) or represents the groups

(b) (c)

in which

R^1 represents in each case optionally halogen-substituted C_1-C_{16}-alkyl, C_2-C_{16}-alkenyl, C_1-C_6-alkoxy-C_2-C_6-alkyl or cycloalkyl having 3-7 ring atoms which may be interrupted by 1 to 2 oxygen and/or sulphur atoms,

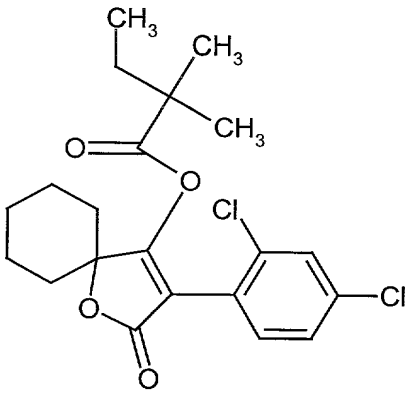
represents optionally halogen-, nitro-, C_1-C_4-alkyl-, C_1-C_4-alkoxy-, C_1-C_3-halogenoalkyl- and/or C_1-C_3-halogenoalkoxy-substituted phenyl;

R^2 represents in each case optionally halogen-substituted C_1-C_{16}-alkyl, C_2-C_{16}-alkenyl or C_1-C_6-alkoxy-C_2-C_6-alkyl,

represents in each optionally halogen-, nitro-, C_1-C_4-alkyl-, C_1-C_4-alkoxy- and/or C_1-C_4-halogenoalkyl-substituted phenyl or benzyl.

3. (Once Amended)A composition, comprising a synergistically effective mixture of:

a) a cyclic ketoenol compound of the Formula (Ia)



(Ia)

and

b) a member selected from the group consisting of one or more agonists of nicotinic acetylcholine receptors and one or more antagonists of nicotinic acetylcholine receptors.

4. (Once Amended) A composition according to any one of Claims 1, 2 or 3, wherein said cyclic ketoenol compound and either said agonist or said antagonist of nicotinic acetylcholine receptors, respectively, are present in a ratio of from 1:100 to 100:1.

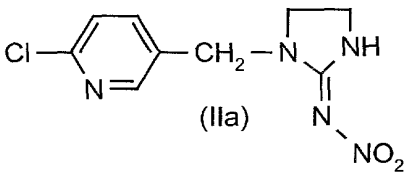
6. (Once Amended) A method for controlling animal pests selected from the group consisting of insects, arachnids, nematodes and combinations thereof comprising the step of applying the composition of any one of Claims 1, 2, 3 or 4 to a member selected from the group consisting of a habitat of said animal pests, said animal pests and combinations thereof.

7. (Once Amended) A process for preparing a pesticide comprising the step of mixing:

a) the composition according to any one of Claims 1, 2, 3 or 4; with

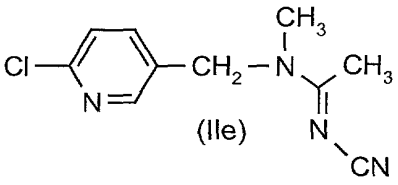
b) a member selected from the group consisting of an extender, a surfactant, and combinations thereof.

8. (Once Amended) The composition according to any one of Claims 1, 2, 3 or 4, wherein said agonist of nicotinic acetylcholine receptors or said antagonist of nicotinic acetylcholine receptors is selected from the group consisting of compounds of the formula:



(IIa)

or



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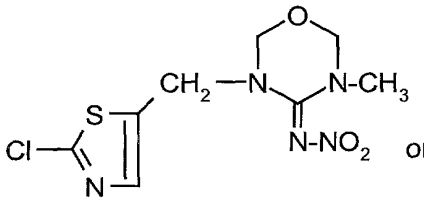
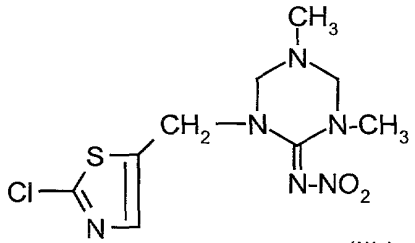


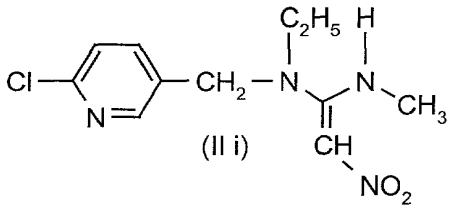
(IIg)

or



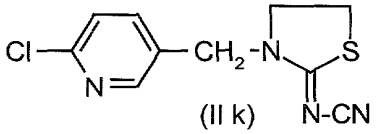
(IIh)

or



(II i)

or



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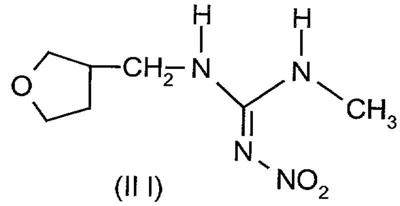

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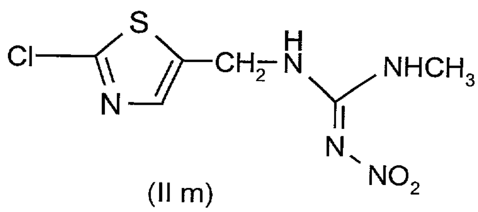

(II m)

REMARKS

This amendment is made to place the claims in conformance with U.S. patent practice. This amendment is not in derogation of any prior art, and Applicant respectfully asserts that it is entitled to the claims as amended and any equivalents thereof. A new Abstract page is included herewith.

Respectfully submitted,

By _____
Raymond J. Harmuth
Attorney for Applicants
Reg. No. 33,896

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FACSIMILE PHONE NUMBER:
(412) 777-8363

s:/sr/rjh0095

VERSION MARKED TO SHOW CHANGES

IN THE SPECIFICATION:

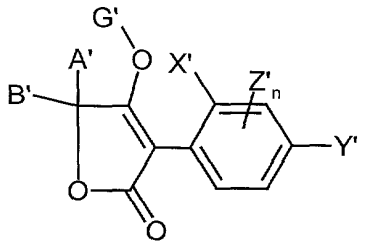
Please amend the Title on page 1 and the Abstract page as follows:
--ACTIVE ~~COMPOUND~~ INGREDIENT COMBINATIONS HAVING INSECTICIDAL AND ACARICIDAL PROPERTIES--.
A new Abstract page is included herewith.

IN THE CLAIMS:

Please cancel Claim 5, and amend the claims as follows.

1. (Once Amended) A ~~C~~composition, comprising a synergistically effective mixture of:

a) a cyclic ketoenol compounds of the ~~f~~Formula (I)



(I)

in which

X' represents C_1-C_6-alkyl, halogen, C_1-C_6-alkoxy or C_1-C_3-halogenoalkyl,

Y' represents hydrogen, C_1-C_6-alkyl, halogen, C_1-C_6-alkoxy, C_1-C_3-halogenoalkyl,

Z' represents C_1-C_6-alkyl, halogen, C_1-C_6-alkoxy,

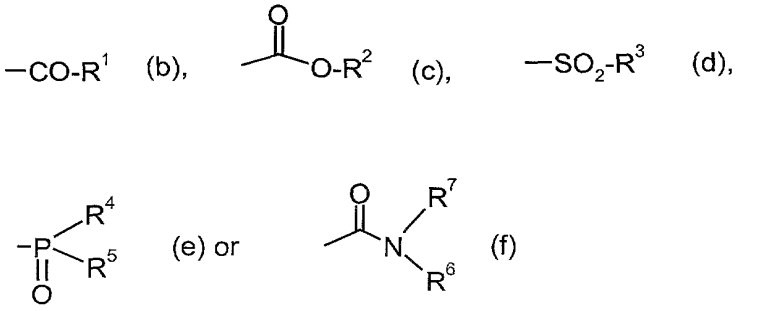
n represents a number from 0 to 3,

A' and B' are identical or different and each represents hydrogen or in each case optionally halogen-substituted straight-chain or branched C_1-C_{12}-alkyl, C_3-C_8-alkenyl, C_3-C_8-alkinyl, C_1-C_{10}-alkoxy-C_2-C_8-alkyl, C_1-C_8-polyalkoxy-C_2-C_8-alkyl, C_1-C_{10}-alkylthio-C_2-C_8-alkyl, cycloalkyl having 3-8 ring atoms which may be interrupted by oxygen and/or sulphur and in each case optionally halogen-, C_1-C_6-alkyl-, C_1-C_6-halogenoalkyl-, C_1-C_6-alkoxy-, C_1-C_6-halogenoalkoxy- and/or nitro-substituted phenyl or phenyl-C_1-C_6-alkyl,

or in which

A' and B' together with the carbon atom to which they are attached form a saturated or unsaturated 3- to 8-membered ring which is optionally interrupted by oxygen and/or sulphur and is optionally substituted by halogen, C_1-C_6-alkyl, C_1-C_6-alkoxy, C_1-C_4-halogenoalkyl, C_1-C_4-halogenoalkoxy, C_1-C_4-alkylthio or optionally substituted phenyl or is optionally benzo-fused,

G' represents hydrogen (a) or represents the groups



in which

R^1 represents in each case optionally halogen-substituted C_1-C_{20}-alkyl, C_2-C_{20}-alkenyl, C_1-C_8-alkoxy-C_2-C_8-alkyl, C_1-C_8-alkylthio-C_2-C_8-alkyl, C_1-C_8-polyalkoxy-C_2-C_8-alkyl or cycloalkyl having 3-8 ring members which may be interrupted by oxygen and/or sulphur atoms, represents optionally halogen-, nitro-, C_1-C_6-alkyl-, C_1-C_6-alkoxy-, C_1-C_6-halogenoalkyl- and/or C_1-C_6-halogenoalkoxy-substituted phenyl;

represents optionally halogen-, C_1-C_6-alkyl-, C_1-C_6-alkoxy-, C_1-C_6-halogenoalkyl- and/or C_1-C_6-halogenoalkoxy-substituted phenyl-C_1-C_6-alkyl,

represents in each case optionally halogen- and/or C_1-C_6-alkyl-substituted pyridyl, pyrimidyl, thiazolyl and pyrazolyl,

or represents optionally halogen- and/or C_1-C_6-alkyl-substituted phenoxy-C_1-C_6-alkyl,

R^2 represents in each case optionally halogen-substituted C_1-C_{20}-alkyl, C_2-C_{20}-alkenyl, C_1-C_8-alkoxy-C_2-C_8-alkyl, C_1-C_8-polyalkoxy-C_2-C_8-alkyl,

represents in each case optionally halogen-, nitro-, C_1-C_6-alkyl, C_1-C_6-alkoxy- and/or C_1-C_6-halogenoalkyl-substituted phenyl or benzyl,

R^3, R^4 and R^5 independently of one another each represent in each case optionally halogen-substituted C_1-C_8-alkyl, C_1-C_8-alkoxy, C_1-C_8-alkylamino, di-(C_1-C_8)-alkylamino, C_1-C_8-alkylthio, C_2-C_5-alkenylthio,

C_2-C_5-alkinylthio, C_3-C_7-cycloalkylthio, represent in each case optionally halogen-, nitro-, cyano-, C_1-C_4-alkoxy-, C_1-C_4-halogenoalkoxy-, C_1-C_4-alkylthio-, C_1-C_4-halogenoalkylthio-, C_1-C_4-alkyl- and/or C_1-C_4-halogenoalkyl-substituted phenyl, phenoxy or phenylthio,

R^6 and R^7 independently of one another each represent in each case optionally halogen-substituted C_1-C_{20}-alkyl, C_1-C_{20}-alkoxy, C_2-C_8-alkenyl, C_1-C_{20}-alkoxy-C_1-C_{20}-alkyl, represent optionally halogen-, C_1-C_{20}-halogenoalkyl-, C_1-C_{20}-alkyl- or C_1-C_{20}-alkoxy-substituted phenyl, represent optionally halogen-, C_1-C_{20}-alkyl-, C_1-C_{20}-halogenoalkyl- or C_1-C_{20}-alkoxy-substituted benzyl or together represent a C_2-C_6-alkylene ring which is optionally interrupted by oxygen, and

b) ~~and at least one~~a member selected from the group consisting of one or more agonists of nicotinic acetylcholine receptors, ~~or~~and one or more antagonists of nicotinic acetylcholine receptors.

2. (Once Amended) The ~~C~~composition~~, comprising a synergistically effective mixture of compounds of the formula (I)~~ according to Claim 1,

in which

X' represents C_1-C_4-alkyl, halogen, C_1-C_4-alkoxy or C_1-C_2-halogenoalkyl,

Y' represents hydrogen, C_1-C_4-alkyl, halogen, C_1-C_4-alkoxy, C_1-C_2-halogenoalkyl,

Z' represents C_1-C_4-alkyl, halogen, C_1-C_4-alkoxy,

n represents 0 or 1,

A' and B' together with the carbon atom to which they are attached form a saturated 5- to 6-membered ring which is optionally substituted by C_1-C_4-alkyl and/or C_1-C_4-alkoxy,

G' represents hydrogen (a) or represents the groups

(b) (c)

in which

R^1 represents in each case optionally halogen-substituted C_1-C_{16}-alkyl, C_2-C_{16}-alkenyl, C_1-C_6-alkoxy-C_2-C_6-alkyl or cycloalkyl having 3-7 ring atoms which may be interrupted by 1 to 2 oxygen and/or sulphur atoms,

represents optionally halogen-, nitro-, C_1-C_4-alkyl-, C_1-C_4-alkoxy-, C_1-C_3-halogenoalkyl- and/or C_1-C_3-halogenoalkoxy-substituted phenyl;

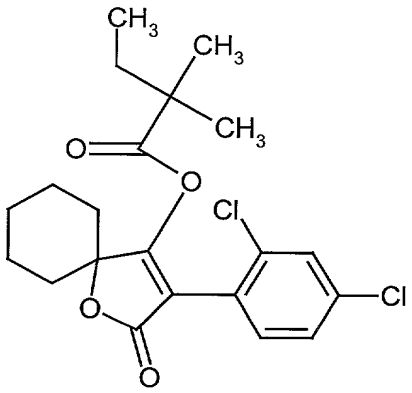
R^2 represents in each case optionally halogen-substituted C_1-C_{16}-alkyl, C_2-C_{16}-alkenyl or C_1-C_6-alkoxy-C_2-C_6-alkyl,

represents in each optionally halogen-, nitro-, C_1-C_4-alkyl-, C_1-C_4-alkoxy- and/or C_1-C_4-halogenoalkyl-substituted phenyl or benzyl,

~~and at least one agonist or antagonist of nicotinic acetylcholine receptors.~~

3. (Once Amended) A ~~C~~composition, comprising a synergistically effective mixture of:

a) ~~the~~a cyclic ketoenol compound of the ~~f~~Formula (Ia)



(Ia)

and

b) ~~at least one~~a member selected from the group consisting of one or more agonists of nicotinic acetylcholine receptors ~~or~~ and one or more antagonists of nicotinic acetylcholine receptors.

4. (Once Amended) A ~~C~~composition according to any one of Claims 1, 2 ~~and~~or 3, ~~comprising compounds of the formula (I)~~wherein said cyclic ketoenol compound and ~~the~~either said agonist or said antagonist of nicotinic acetylcholine receptors, respectively, are present in a ratio of from 1:100 to 100:1.

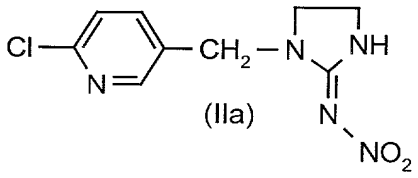
6. (Once Amended) A ~~M~~method for controlling animal pests selected from the group consisting of insects, arachnids, nematodes and combinations thereof comprising the step of applying the composition of any one of claims 1, 2, 3 or 4 to a member selected from the group consisting of a habitat of said animal pests, said animal pests and combinations thereof. ~~, characterized in that mixtures as defined in any of Claims 1, 2 and 3 are allowed to act on animal pests and/or their habitat.~~

7. (Once Amended) A ~~P~~process for preparing a pesticides~~, characterized in that a~~comprising the step of mixing:

a) the composition ~~synergistially effective amount comprising compounds of the formula (I)~~ according to any one of Claims 1, 2, ~~and~~ 3 or 4; ~~and at least one agonist or antagonist of nicotinic acetylcholine receptors is mixed~~ with

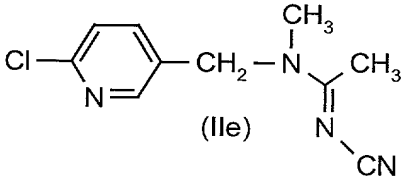
b) a member selected from the group consisting of an extender, ~~s and/or~~ a surfactant, sand combinations thereof.

8. (Once Amended) ~~Mixtures~~The composition according to any one of Claims 1, 2, 3 ~~and~~or 4, ~~comprising at least one of the following compounds~~wherein said agonist of nicotinic acetylcholine receptors or said antagonist of nicotinic acetylcholine receptors is selected from the group consisting of compounds of the formula:

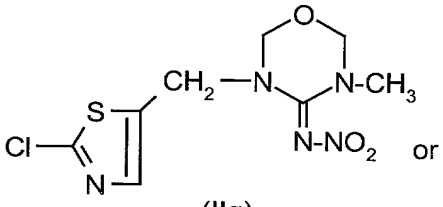


(IIa)

or

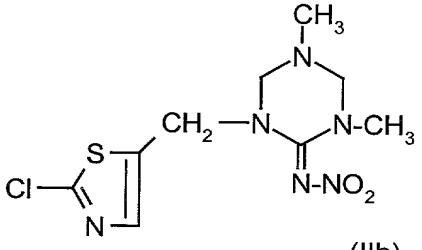


(IIe)



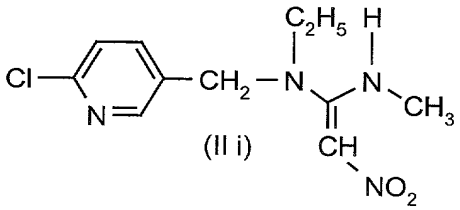
(IIg)

or

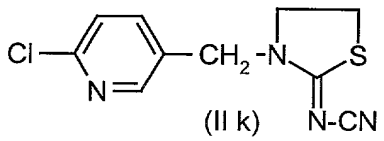


(IIh)

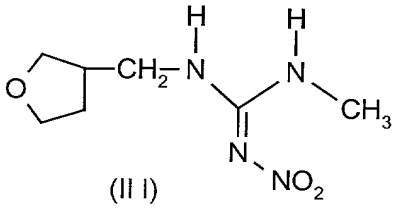
or



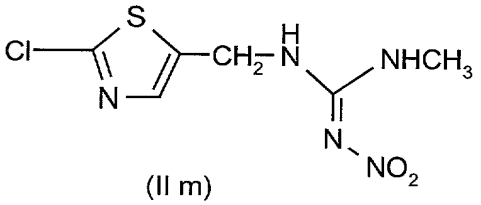
(II i)

or 

(II k)

or 

(II l)



(II m)

ACTIVE INGREDIENT COMBINATIONS HAVING INSECTICIDAL AND ACARICIDAL PROPERTIES

ABSTRACT

The invention relates to insecticidal and acaricidal mixtures comprising certain cyclic ketoenols and agonists or antagonists of nicotinic acetylcholine receptors for protecting plants against attack by pests.

10/089989

JC15 Rec'd PCT/PTO 0 2 APR 2002

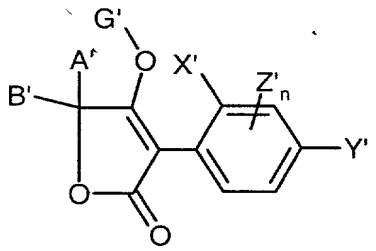
Active compound combinations having insecticidal and acaricidal properties

The present invention relates to novel active compound combinations comprising, on the one hand, a known cyclic ketoenol and, on the other hand, further known insecticidally active compounds, which combinations have very good insecticidal and acaricidal properties.

It is already known that certain cyclic ketoenols can be employed for controlling animal pests such as insects and undesirable acarids (cf. EP-A-528 156). The activity of these substances is good, but sometimes unsatisfactory at low application rates.

Furthermore, it is also known that agonists and antagonists of nicotinic acetylcholine receptors can be used for controlling insects.

It has now been found that mixtures of cyclic ketoenols of the formula (I)



(I)

in which

X' represents C_1-C_6-alkyl, halogen, C_1-C_6-alkoxy or C_1-C_3-halogenoalkyl,

Y' represents hydrogen, C_1-C_6-alkyl, halogen, C_1-C_6-alkoxy, C_1-C_3-halogenoalkyl,

Z' represents C_1-C_6-alkyl, halogen, C_1-C_6-alkoxy,

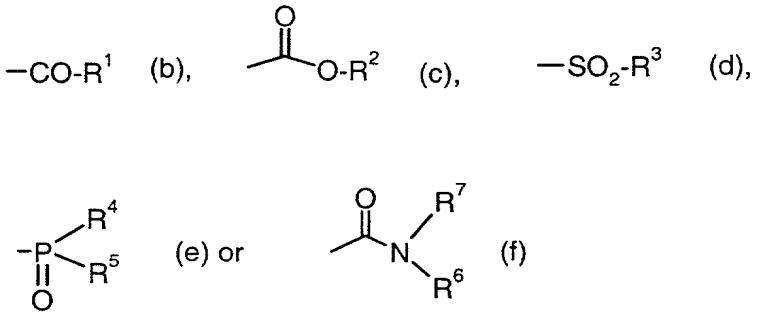
n represents a number from 0 to 3,

A' and B' are identical or different and each represents hydrogen or in each case optionally halogen-substituted straight-chain or branched C_1-C_{12}-alkyl, C_3-C_8-alkenyl, C_3-C_8-alkinyl, C_1-C_{10}-alkoxy-C_2-C_8-alkyl, C_1-C_8-polyalkoxy-C_2-C_8-alkyl, C_1-C_{10}-alkylthio-C_2-C_8-alkyl, cycloalkyl having 3-8 ring atoms which may be interrupted by oxygen and/or sulphur and in each case optionally halogen-, C_1-C_6-alkyl-, C_1-C_6-halogenoalkyl-, C_1-C_6-alkoxy-, C_1-C_6-halogenoalkoxy- and/or nitro-substituted phenyl or phenyl-C_1-C_6-alkyl,

or in which

A' and B' together with the carbon atom to which they are attached form a saturated or unsaturated 3- to 8-membered ring which is optionally interrupted by oxygen and/or sulphur and is optionally substituted by halogen, C_1-C_6-alkyl, C_1-C_6-alkoxy, C_1-C_4-halogenoalkyl, C_1-C_4-halogenoalkoxy, C_1-C_4-alkylthio or optionally substituted phenyl or is optionally benzo-fused,

G' represents hydrogen (a) or represents the groups



in which

R^1 represents in each case optionally halogen-substituted C_1-C_{20}-alkyl, C_2-C_{20}-alkenyl, C_1-C_8-alkoxy-C_2-C_8-alkyl, C_1-C_8-alkylthio-C_2-C_8-alkyl, C_1-C_8-polyalkoxy-C_2-C_8-alkyl or cycloalkyl having 3-8 ring members which may be interrupted by oxygen and/or sulphur atoms,

represents optionally halogen-, nitro-, C_1-C_6-alkyl-, C_1-C_6-alkoxy-, C_1-C_6-halogenoalkyl- and/or C_1-C_6-halogenoalkoxy-substituted phenyl;

represents optionally halogen-, C_1-C_6-alkyl-, C_1-C_6-alkoxy-, C_1-C_6-halogenoalkyl- and/or C_1-C_6-halogenoalkoxy-substituted phenyl-C_1-C_6-alkyl,

represents in each case optionally halogen- and/or C_1-C_6-alkyl-substituted pyridyl, pyrimidyl, thiazolyl and pyrazolyl,

or represents optionally halogen- and/or C_1-C_6-alkyl-substituted phenoxy-C_1-C_6-alkyl,

R^2 represents in each case optionally halogen-substituted C_1-C_{20}-alkyl, C_2-C_{20}-alkenyl, C_1-C_8-alkoxy-C_2-C_8-alkyl, C_1-C_8-polyalkoxy-C_2-C_8-alkyl,

represents in each case optionally halogen-, nitro-, C_1-C_6-alkyl, C_1-C_6-alkoxy- and/or C_1-C_6-halogenoalkyl-substituted phenyl or benzyl,

R^3, R^4 and R^5 independently of one another each represent in each case optionally halogen-substituted C_1-C_8-alkyl, C_1-C_8-alkoxy, C_1-C_8-alkylamino, di-(C_1-C_8)-alkylamino, C_1-C_8-alkylthio, C_2-C_5-alkenylthio, C_2-C_5-alkinylthio, C_3-C_7-cycloalkylthio, represent in each case optionally halogen-, nitro-, cyano-, C_1-C_4-alkoxy-, C_1-C_4-halogenoalkoxy-, C_1-C_4-alkylthio-, C_1-C_4-halogenoalkylthio-, C_1-C_4-alkyl- and/or C_1-C_4-halogenoalkyl-substituted phenyl, phenoxy or phenylthio,

R^6 and R^7 independently of one another each represent in each case optionally halogen-substituted C_1-C_{20}-alkyl, C_1-C_{20}-alkoxy, C_2-C_8-alkenyl, C_1-C_{20}-alkoxy-C_1-C_{20}-alkyl, represent optionally halogen-, C_1-C_{20}-halogenoalkyl-, C_1-C_{20}-alkyl- or C_1-C_{20}-alkoxy-substituted phenyl, represent optionally halogen-, C_1-C_{20}-alkyl-, C_1-C_{20}-halogenoalkyl- or C_1-C_{20}-alkoxy-substituted benzyl or together represent a C_2-C_6-alkylene ring which is optionally interrupted by oxygen,

and at least one acetylcholine receptor agonist or antagonist of the formula (II) are synergistically active and suitable for controlling animal pests. Owing to this synergism, it is possible to use considerably lower amounts of active compound, i.e. the activity of the mixture is higher than the activity of the individual components.

Preference is given to mixtures comprising compounds of the formula (I)

in which

X' represents C_1-C_4-alkyl, halogen, C_1-C_4-alkoxy or C_1-C_2-halogenoalkyl,

Y' represents hydrogen, C_1-C_4-alkyl, halogen, C_1-C_4-alkoxy, C_1-C_2-halogenoalkyl,

Z' represents C_1-C_4-alkyl, halogen, C_1-C_4-alkoxy,

n represents 0 or 1,

A' and B' together with the carbon atom to which they are attached form a saturated 5- to 6-membered ring which is optionally substituted by C_1-C_4-alkyl and/or C_1-C_4-alkoxy,

G' represents hydrogen (a) or represents the groups

in which

R^1 represents in each case optionally halogen-substituted C_1-C_{16}-alkyl, C_2-C_{16}-alkenyl, C_1-C_6-alkoxy-C_2-C_6-alkyl or cycloalkyl having 3-7 ring atoms which may be interrupted by 1 to 2 oxygen and/or sulphur atoms,

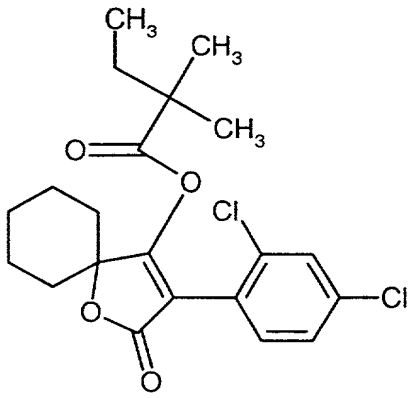
represents optionally halogen-, nitro-, C_1-C_4-alkyl-, C_1-C_4-alkoxy-, C_1-C_3-halogenoalkyl- and/or C_1-C_3-halogenoalkoxy-substituted phenyl;

R^2 represents in each case optionally halogen-substituted C_1-C_{16}-alkyl, C_2-C_{16}-alkenyl or C_1-C_6-alkoxy-C_2-C_6-alkyl,

represents in each optionally halogen-, nitro-, C_1-C_4-alkyl-, C_1-C_4-alkoxy- and/or C_1-C_4-halogenoalkyl-substituted phenyl or benzyl,

and at least one acetylcholine receptor agonist or antagonist of the formula (II).

Particular preference is given to mixtures comprising the dihydrofuranone derivative of the formula (Ia)



(Ia)

and at least one acetylcholine receptor agonist or antagonist of the formula (II).

The agonists and antagonists of the nicotinic acetylcholine receptors are known compounds which are known from the following publications:

European Published Specifications Nos. 464 830, 428 941, 425 978, 386 565, 383 091, 375 907, 364 844, 315 826, 259 738, 254 859, 235 725, 212 600, 192 060, 163 855, 154 178, 136 636, 136 686, 303 570, 302 833, 306 696, 189 972, 455 000, 135 956, 471 372, 302 389, 428 941, 376 279, 493 369, 580 553, 649 845, 685 477, 483 055, 580 553;

German Offenlegungsschriften Nos. 3 639 877, 3 712 307;

Japanese Published Specifications Nos. 03 220 176, 02 207 083, 63 307 857, 63 287 764, 03 246 283, 04 9371, 03 279 359, 03 255 072, 05 178 833, 07 173 157, 08 291 171;

US Patents Nos. 5 034 524, 4 948 798, 4 918 086, 5 039 686, 5 034 404, 5 532 365;

PCT Applications Nos. WO 91/17 659, 91/4965;

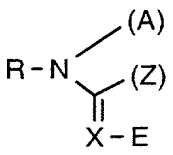
French Application No. 2 611 114;

Brazilian Application No. 88 03 621.

The generic formulae and definitions described in these publications, and also the individual compounds described therein, are expressly incorporated herein by reference.

Some of these compounds are summarized under the term nitromethylenes, nitroimines and related compounds.

Preferably, these compounds can be summarized under the formula (II)



(II)

in which

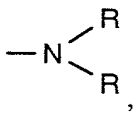
R represents hydrogen or represents optionally substituted radicals selected from the group consisting of acyl, alkyl, aryl, aralkyl, heterocyclyl, heteroaryl and heteroarylalkyl;

A represents a monofunctional group selected from the group consisting of hydrogen, acyl, alkyl, aryl or represents a bifunctional group which is linked to the radical Z;

E represents an electron-withdrawing radical;

X represents the radicals -CH= or =N-, where the radical -CH= may be linked to the radical Z instead of an H atom;

Z represents a monofunctional group selected from the group consisting of alkyl, -O-R, -S-R,



where the radicals R are identical or different and are as defined above,

or represents a bifunctional group which is linked to the radical A or the radical X.

Particular preference is given to compounds of the formula (II) in which the radicals have the following meaning:

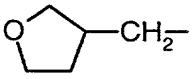
R represents hydrogen and represents optionally substituted radicals selected from the group consisting of acyl, alkyl, aryl, aralkyl, heterocyclylalkyl, heteroaryl, heteroarylalkyl.

Examples of acyl radicals are formyl, alkylcarbonyl, arylcarbonyl, alkylsulphonyl, arylsulphonyl, (alkyl-)-(aryl-)-phosphoryl, which may themselves be substituted.

Examples of alkyl are C_1-C_{10}-alkyl, in particular C_1-C_4-alkyl, specifically methyl, ethyl, i-propyl, sec- or t-butyl, which may themselves be substituted.

Examples of aryl are phenyl, naphthyl, in particular phenyl.

Examples of aralkyl are phenylmethyl, phenethyl.

An example of heterocyclylalkyl is the radical  .

Examples of heteroaryl are heteroaryl having up to 10 ring atoms and N, O, S, in particular N, as heteroatoms. Specific examples are thienyl, furyl, thiazolyl, imidazolyl, pyridyl, benzthiazolyl, pyridazinyl.

Examples of heteroarylalkyl are heteroarylmethyl, heteroarylethyl having up to 6 ring atoms and N, O, S, in particular N, as heteroatoms, in particular optionally substituted heteroaryl as defined under heteroaryl.

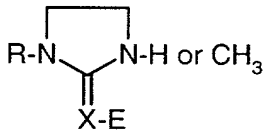
Substituents which may be mentioned by way of example and by way of preference are:

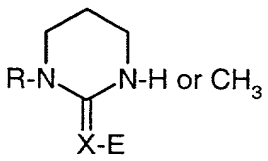
alkyl having preferably 1 to 4, in particular 1 or 2, carbon atoms, such as methyl, ethyl, n- and i-propyl and n-, i- and t-butyl; alkoxy having preferably 1 to 4, in particular 1 or 2, carbon atoms, such as methoxy, ethoxy, n- and i-propyloxy and n-, i- and t-butyloxy; alkylthio having preferably 1 to 4, in particular 1 or 2, carbon atoms, such as methylthio, ethylthio, n- and i-propylthio and n-, i- and t-butylthio; halogenoalkyl having preferably 1 to 4, in particular 1 or 2, carbon atoms and preferably 1 to 5, in particular 1 to 3, halogen atoms, the halogen atoms being identical or different, and preferred halogen atoms being fluorine, chlorine or bromine, in particular fluorine, such as trifluoromethyl, hydroxyl; halogen, preferably fluorine, chlorine, bromine and iodine, in particular fluorine, chlorine and bromine, cyano; nitro; amino; monoalkyl- and dialkylamino having preferably 1 to 4, in particular 1 or 2, carbon atoms per alkyl group, such as methylamino, methylethylamino, n- and i-propylamino and methyl-n-butylamino; carboxyl; carbalkoxy having preferably 2 to 4, in particular 2 or 3, carbon atoms, such as carbomethoxy and carboethoxy; sulpho ($-SO_3H$); alkylsulphonyl having preferably 1 to 4, in particular 1 or 2, carbon atoms, such as methylsulphonyl and ethylsulfonyl; arylsulphonyl having preferably 6 or 10 aryl carbon atoms, such as phenylsulphonyl, and also heteroarylamino and heteroarylalkylamino such as chlorpyridylamino and chloropyridylmethylamino.

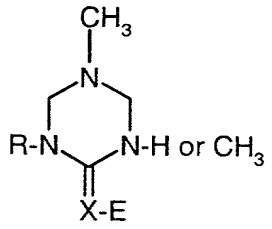
A represents hydrogen or represents an optionally substituted radical selected from the group consisting of acyl, alkyl, aryl, which are preferably as defined under R, A furthermore represents a bifunctional group. Examples include optionally substituted alkylene having 1 to 4, in particular 1 or 2, C atoms, examples of substituents being the substituents which have been listed further above (and where the alkylene groups may be interrupted by heteroatoms from the group consisting of N, O, S).

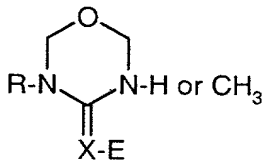
A and Z together with the atoms to which they are attached may form a saturated or unsaturated heterocyclic ring. The heterocyclic ring may contain a further 1 or 2 identical or different heteroatoms and/or hetero groups. Preferred heteroatoms are oxygen, sulphur or nitrogen, and preferred hetero groups are N-alkyl, where the alkyl of the N-alkyl group contains preferably 1 to 4, in particular 1 or 2, carbon atoms. Examples of alkyl include methyl, ethyl, n- and i-propyl, and n-, i- and t-butyl. The heterocyclic ring contains 5 to 7, preferably 5 or 6, ring members.

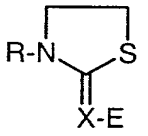
Examples of compounds of the formula (II) in which A and Z together with the atoms to which they are attached form a ring include the following:

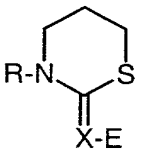












in which

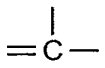
E, R and X are each as defined above and further below.

E represents an electron-withdrawing radical, specific examples being NO_2, CN, halogenoalkylcarbonyl, such as halogeno-C_1-C_4-alkylcarbonyl, for example $COCF_3$, alkylsulphonyl (for example SO_2-CH_3), halogenoalkylsulphonyl (for example SO_2CF_3) and with particular preference NO_2 or CN.

X represents -CH= or -N= .

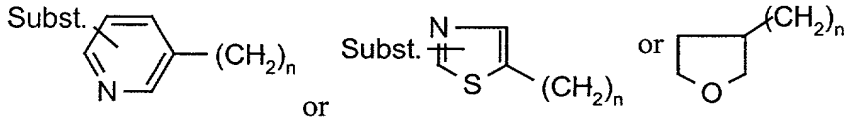
Z represents an optionally substituted radical selected from the group consisting of alkyl, -OR, -SR, -NRR, where R and the substituents are preferably as defined above.

Z may, in addition to the ring mentioned above, together with the atom to which it is attached and the radical



instead of X, form a saturated or unsaturated heterocyclic ring. The heterocyclic ring may contain a further 1 or 2 identical or different heteroatoms and/or hetero groups. Preferred heteroatoms are oxygen, sulphur or nitrogen and preferred hetero groups are N-alkyl, where the alkyl or N-alkyl group contains preferably 1 to 4, preferably 1 or 2, carbon atoms. Examples of alkyl include methyl, ethyl, n- and i-propyl and n-, i- and t-butyl. The heterocyclic ring contains 5 to 7, preferably 5 or 6, ring members. Examples of the heterocyclic ring include pyrrolidine, piperidine, piperazine, hexamethyleneimine, morpholine and N-methylpiperazine.

The agonists and antagonists of the nicotinic acetylcholine receptors are particularly preferably compounds of the formula (II) in which

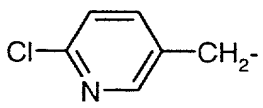
R represents  or

where

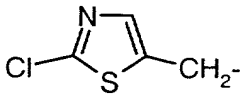
n represents 0, 1 or 2, and preferably represents 1,

Subst. represents one of the substituents mentioned above, especially halogen, in particular chlorine, and A, Z, X and E are each as defined above.

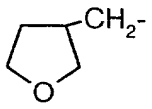
R represents in particular



or

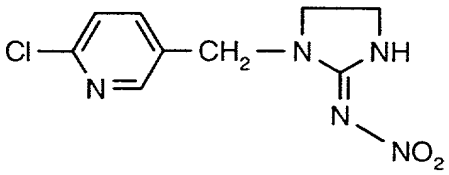


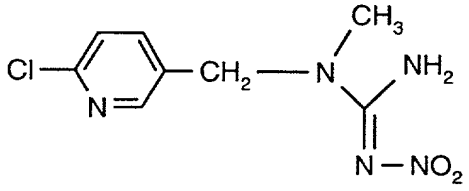
or

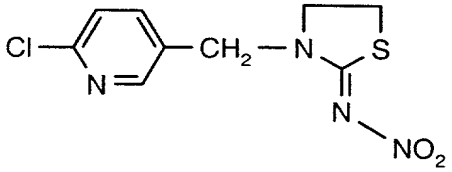


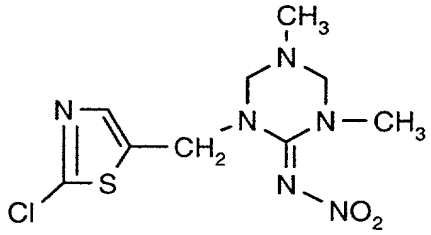
.

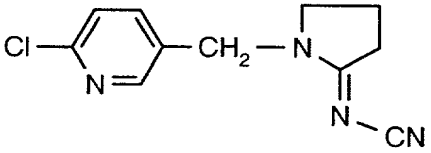
The following compounds are specific examples:

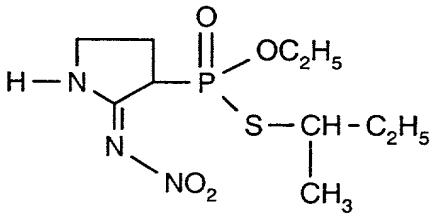


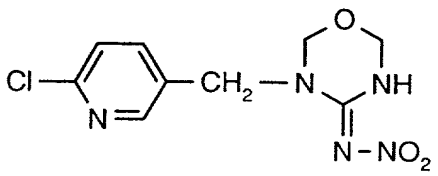


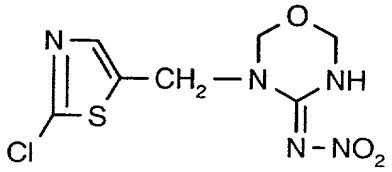


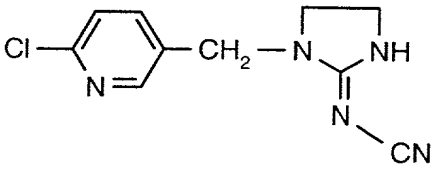


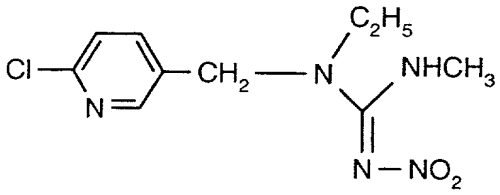


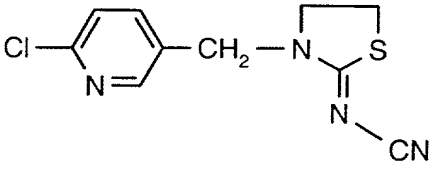


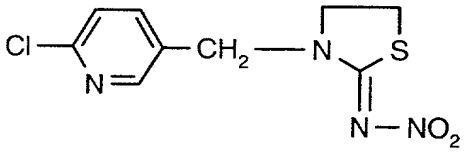


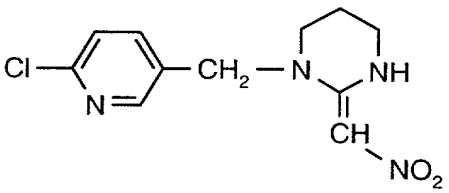


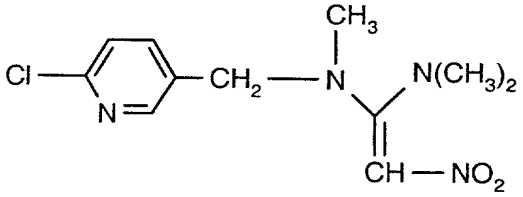


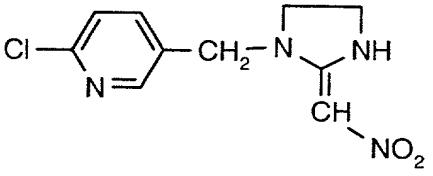


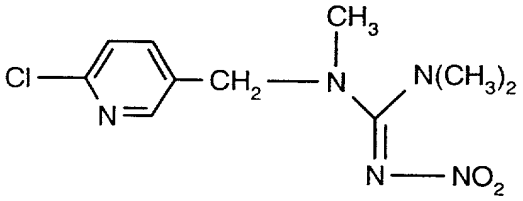


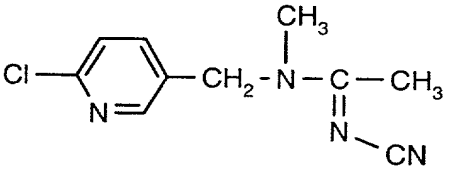


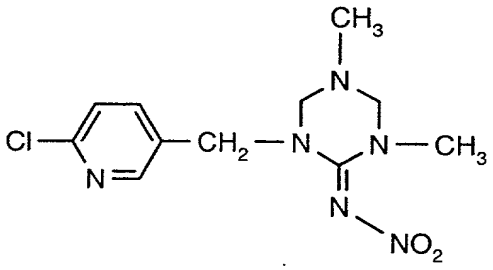


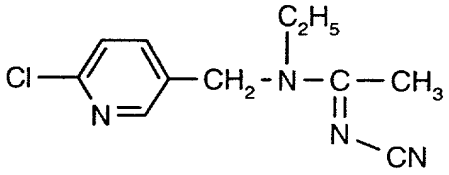


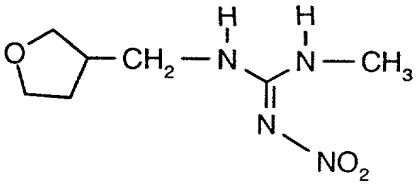


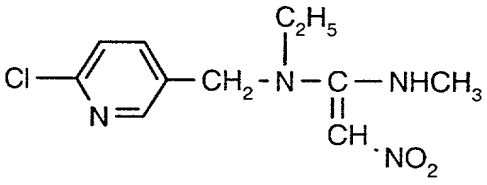


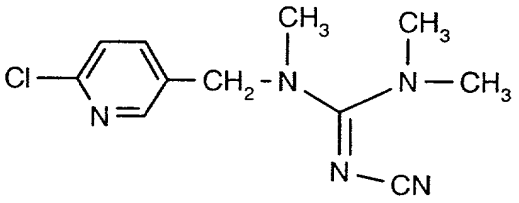


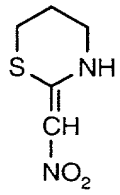


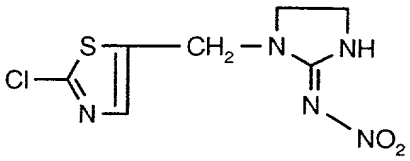


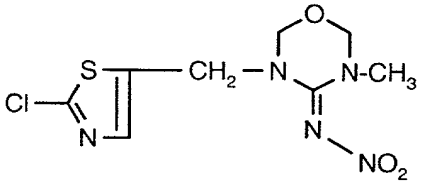


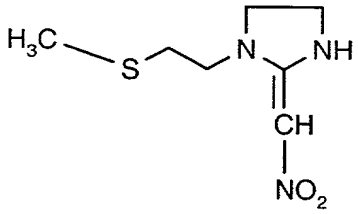


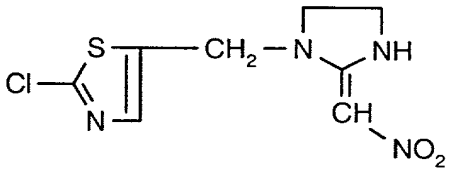


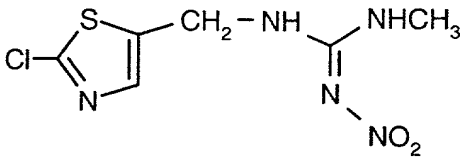


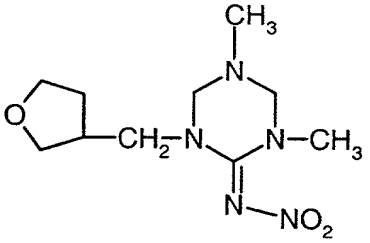


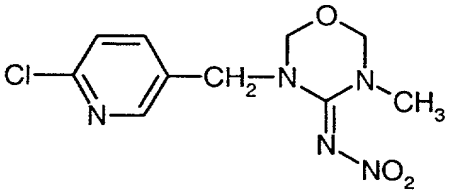


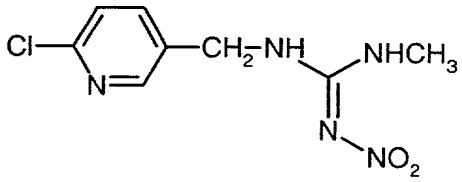


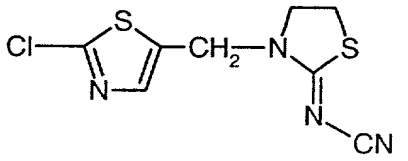


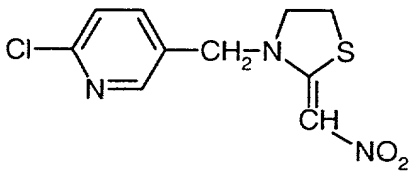


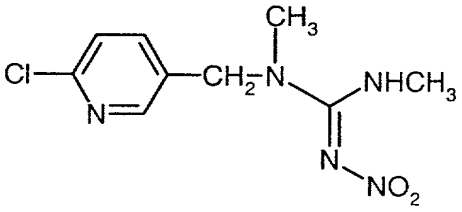


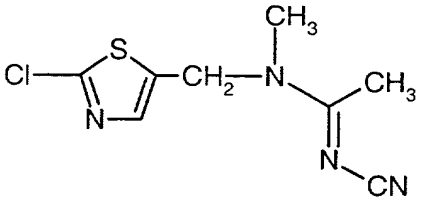


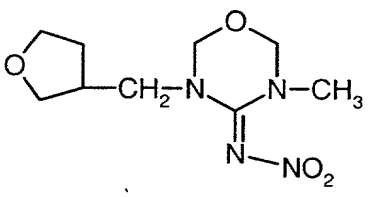




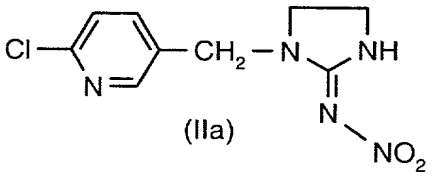




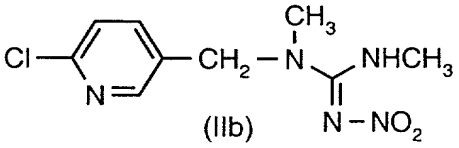




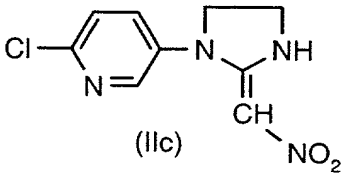
Very particularly preferred agonists and antagonists of the nicotinic acetylcholine receptors are compounds of the following formulae:



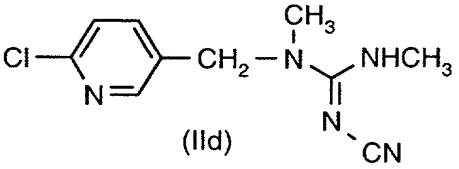
(IIa)



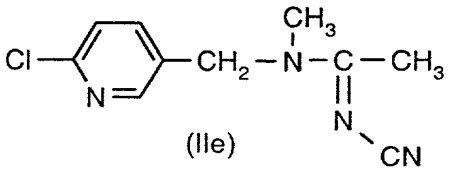
(IIb)



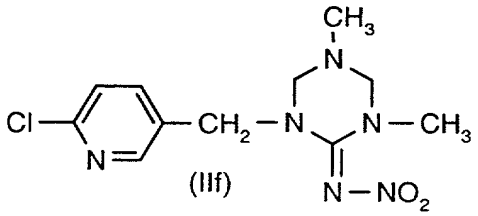
(IIc)



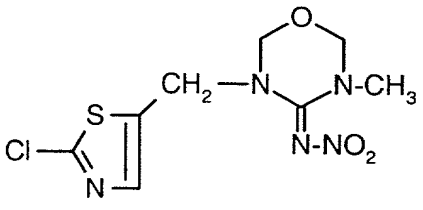
(IId)



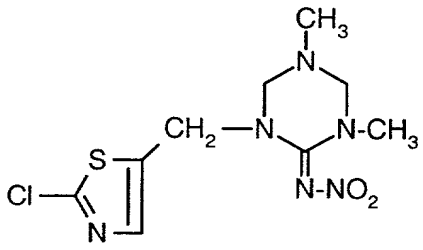
(IIe)



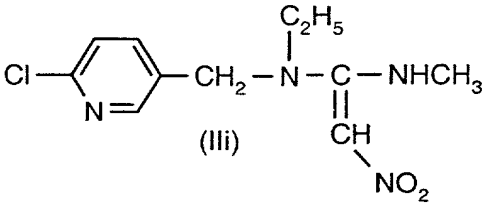
(IIf)



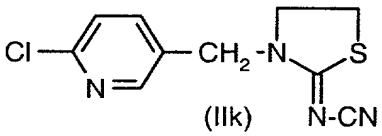
(IIg)



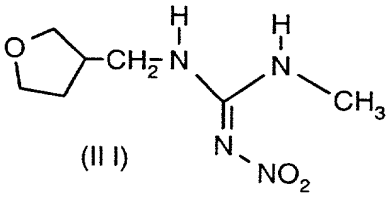
(IIh)



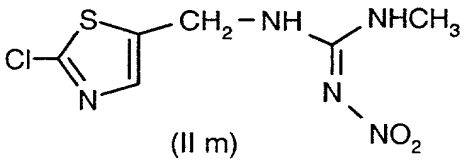
(IIi)



(IIk)

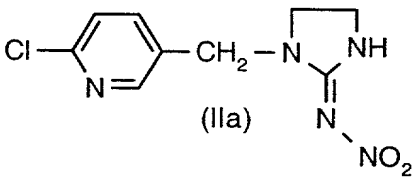


(II l)



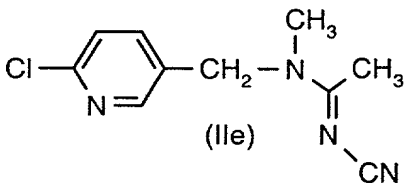
(II m)

in particular a compound of the following formula

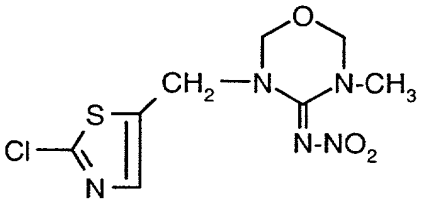


(IIa)

or

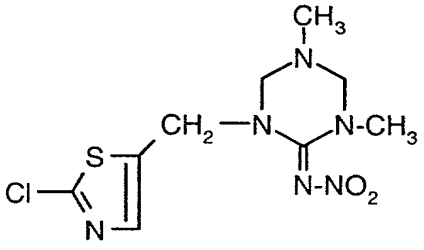


(IIe)

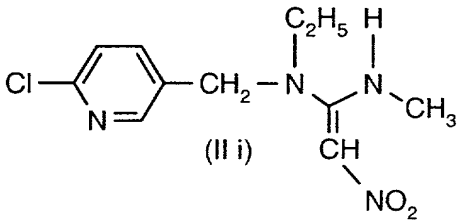


(IIg)

or



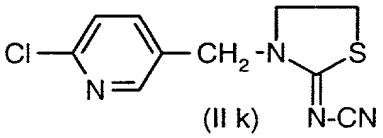
(IIh)



(II i)

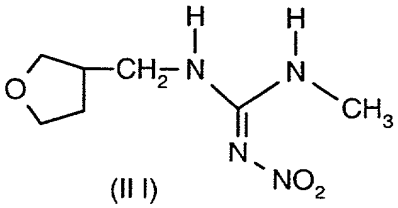
or

or



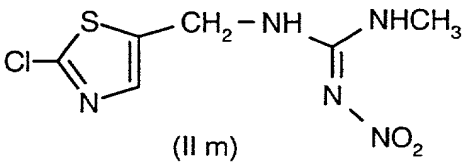
(II k)

or



(II l)

or



(II m)

Very particular preference is given to the compounds of the formulae (IIa), (IIk), (IIm).

Furthermore, very particular preference is given to the compounds of the formulae (IIe), (IIg), (IIh), (II l), (IIc).

A particularly preferred mixture comprises the compound of the formula (Ia) and the compound of the formula (IIa);
a further particularly preferred mixture comprises the compound of the formula (Ia) and the compound of the formula (IIk);
particular preference is furthermore given to mixtures which comprise the compound of the formula (Ia) and the compound of the formula (IIm).

The active compound mixtures are suitable for controlling animal pests, in particular insects, arachnids and nematodes, encountered in agriculture, in forests, in the protection of stored products and in the hygiene sector, and they are tolerated well by plants and have favourable toxicity to warm-blooded animals. They are active against normally sensitive and resistant species and against all or some stages of development. The abovementioned pests include:

From the order of the Isopoda, for example, Oniscus asellus, Armadillidium vulgare and Porcellio scaber.
From the order of the Diplopoda, for example, Blaniulus guttulatus.
From the order of the Chilopoda, for example, Geophilus carpophagus and Scutigera spec.
From the order of the Symphyla, for example, Scutigerella immaculata.
From the order of the Thysanura, for example, Lepisma saccharina.
From the order of the Collembola, for example, Onychiurus armatus.
From the order of the Orthoptera, for example, Blatta orientalis, Periplaneta americana, Leucophaea maderae, Blatella germanica, Acheta domesticus, Gryllotalpa spp., Locusta migratoria migratorioides, Melanoplus differentialis and Schistocerca gregaria.
From the order of the Dermaptera, for example, Forficula auricularia.
From the order of the Isoptera, for example, Reticulitermes spp.

From the order of the Anoplura, for example, Pediculus humanus corporis, Haematopinus spp. and Linognathus spp.

From the order of the Mallophaga, for example, Trichodectes spp. and Damalinea spp.

From the order of the Thysanoptera, for example, Hercinothrips femoralis and Thrips tabaci.

From the order of the Heteroptera, for example, Eurygaster spp., Dysdercus intermedius, Piesma quadrata, Cimex lectularius, Rhodnius prolixus and Triatoma spp.

From the order of the Homoptera, for example, Aleurodes brassicae, Bemisia tabaci, Trialeurodes vaporariorum, Aphis gossypii, Brevicoryne brassicae, Cryptomyzus ribis, Doralis fabae, Doralis pomi, Eriosoma lanigerum, Hyalopterus arundinis, Macrosiphum avenae, Myzus spp., Phorodon humuli, Rhopalosiphum padi, Phylloxera vastatrix, Pemphigus spp., Empoasca spp., Euscelis bilobatus, Nephotettix cincticeps, Lecanium corni, Saissetia oleae, Laodelphax striatellus, Nilaparvata lugens, Aonidiella aurantii, Aspidiotus hederae, Pseudococcus spp. and Psylla spp.

From the order of the Lepidoptera, for example, Pectinophora gossypiella, Bupalus piniarius, Cheimatobia brumata, Lithocolletis blancardella, Hyponomeuta padella, Plutella maculipennis, Malacosoma neustria, Euproctis chrysorrhoea, Lymantria spp., Bucculatrix thurberiella, Phyllocnistis citrella, Agrotis spp., Euxoa spp., Feltia spp., Earias insulana, Heliothis spp., Laphygma exigua, Mamestra brassicae, Panolis flammea, Prodenia litura, Spodoptera spp., Trichoplusia ni, Carpocapsa pomonella, Pieris spp., Chilo spp., Pyrausta nubilalis, Ephestia kuehniella, Galleria mellonella, Tineola bisselliella, Tinea pellionella, Hofmannophila pseudospretella, Cacoecia podana, Capua reticulana, Choristoneura fumiferana, Clysia ambiguella, Homona magnanima and Tortrix viridana.

From the order of the Coleoptera, for example, Anobium punctatum, Rhizopertha dominica, Bruchidius obtectus, Acanthoscelides obtectus, Hylotrupes bajulus, Agelastica alni, Leptinotarsa decemlineata, Phaedon cochleariae, Diabrotica spp., Psylliodes chrysocephala, Epilachna varivestis, Atomaria spp., Oryzaephilus surinamensis, Anthonomus spp., Sitophilus spp., Otiorrhynchus sulcatus, Cosmopolites sordidus, Ceuthorrhynchus assimilis, Hypera postica, Dermestes spp., Trogoderma

spp., Anthrenus spp., Attagenus spp., Lyctus spp., Meligethes aeneus, Ptinus spp., Niptus hololeucus, Gibbium psylloides, Tribolium spp., Tenebrio molitor, Agriotes spp., Conoderus spp., Melolontha melolontha, Amphimallon solstitialis and Costelytra zealandica.

From the order of the Hymenoptera, for example, Diprion spp., Hoplocampa spp., Lasius spp., Monomorium pharaonis and Vespa spp.

From the order of the Diptera, for example, Aedes spp., Anopheles spp., Culex spp., Drosophila melanogaster, Musca spp., Fannia spp., Calliphora erythrocephala, Lucilia spp., Chrysomyia spp., Cuterebra spp., Gastrophilus spp., Hyppobosca spp., Stomoxys spp., Oestrus spp., Hypoderma spp., Tabanus spp., Tannia spp., Bibio hortulanus, Oscinella frit, Phorbia spp., Pegomyia hyoscyami, Ceratitis capitata, Dacus oleae and Tipula paludosa.

From the order of the Siphonaptera, for example, Xenopsylla cheopis and Ceratophyllus spp.

From the order of the Arachnida, for example, Scorpio maurus and Latrodectus mactans.

From the order of the Acarina, for example, Acarus siro, Argas spp., Ornithodoros spp., Dermanyssus gallinae, Eriophyes ribis, Phyllocoptruta oleivora, Boophilus spp., Rhipicephalus spp., Amblyomma spp., Hyalomma spp., Ixodes spp., Psoroptes spp., Chorioptes spp., Sarcoptes spp., Tarsonemus spp., Bryobia praetiosa, Panonychus spp. and Tetranychus spp.

The phytoparasitic nematodes include Pratylenchus spp., Radopholus similis, Ditylenchus dipsaci, Tylenchulus semipenetrans, Heterodera spp., Meloidogyne spp., Aphelenchoides spp., Longidorus spp., Xiphinema spp., Trichodorus spp.

The ratio of the compounds of the formula (I) and the compounds of the formula (II) employed, and the total amount of the mixture, depends on the kind and the occurrence of the pests. For each application, the optimum ratios and overall application rates can be determined in each case by test series. In general, the ratio of the compounds of the formula (I) to the compounds of the formula (II) is from 1:100

to 100:1, preferably from 1:25 to 25:1 and particularly preferably from 1:5 to 5:1. These are parts by weight.

The active compound mixtures according to the invention can be present in their commercially available formulations and in the use forms, prepared from these formulations, as a mixture with other active compounds, such as insecticides, attractants, sterilizing agents, acaricides, nematicides, fungicides, growth-regulating substances or herbicides. The insecticides include, for example, phosphoric esters, carbamates, carboxylates, chlorinated hydrocarbons, phenylureas and substances produced by microorganisms. Specifically, the insecticides and fungicides mentioned further above may be mentioned as mixing components.

Insecticides which can be admixed, if appropriate, are, for example:

Phosphoric esters, such as azinphos-ethyl, azinphos-methyl, α-1-(4-chlorophenyl)-4-(O-ethyl, S-propyl)phosphoryloxy-pyrazole, chlorpyrifos, coumaphos, demeton, demeton-S-methyl, diazinon, dichlorvos, dimethoate, ethoate, ethoprophos, etrimfos, fenitrothion, fenthion, heptenophas, parathion, parathion-methyl, phosalone, phoxim, pirimiphos-ethyl, pirimiphos-methyl, profenofos, prothiofos, sulprofos, triazophos and trichlorfon;

carbamates, such as aldicarb, bendiocarb, α-2-(1-methylpropyl)-phenyl methylcarbamate, butocarboxim, butoxycarboxim, carbaryl, carbofuran, carbosulfan, cloethocarb, isoprocarb, methomyl, oxamyl, pirimicarb, promecarb, propoxur and thiodicarb;

organosilicon compounds, preferably dimethyl(phenyl)silyl-methyl 3-phenoxybenzyl ethers, such as dimethyl-(4-ethoxyphenyl)-silylmethyl 3-phenoxybenzyl ether, or (dimethylphenyl)-silyl-methyl 2-phenoxy-6-pyridylmethyl ethers, such as, for example, dimethyl-(9-ethoxy-phenyl)-silylmethyl 2-phenoxy-6-pyridylmethyl ether, or [(phenyl)-3-(3-phenoxyphenyl)-propyl](dimethyl)-silanes, such as, for example, (4-ethoxyphenyl)-[3-(4-fluoro-3-phenoxyphenyl)-propyl]dimethyl-silane, silafluofen;

pyrethroids, such as allethrin, alphamethrin, bioresmethrin, byfenthrin, cycloprothrin, cyfluthrin, decamethrin, cyhalothrin, cypermethrin, deltamethrin, alpha-cyano-3-phenyl-2-methylbenzyl-2,2-dimethyl-3-(2-chloro-2-trifluoro-methylvinyl)cyclopropanecarboxylate, fenpropathrin, fenfluthrin, fenvalerate, flucythrinate, flumethrin, fluvalinate, permethrin, resmethrin and tralomethrin;

nitroimines and nitromethylenes, such as 1-[(6-chloro-3-pyridyl)-methyl]-4,5-dihydro-N-nitro-1H-imidazole-2-amine (imidacloprid), N-[(6-chloro-3-pyridyl)methyl]-N^2-cyano-N^1-methylacetamide (NI-25);

abamectin, AC 303.630, acephate, acrinathrin, alanycarb, aldoxycarb, aldrin, amitraz, azamethiphos, Bacillus thuringiensis, phosmet, phosphamidon, phosphine, prallethrin, propaphos, propetamphos, prothoate, pyraclofos, pyrethrins, pyridaben, pyridafenthion, pyriproxyfen, quinalphos, RH-7988, rotenone, sodium fluoride, sodium hexafluorosilicate, sulfotep, sulphuryl fluoride, tar oils, teflubenzuron, tefluthrin, temephos, terbufos, tetrachlorvinphos, tetramethrin, O-2-tert-butyl-pyrimidin-5-yl O-isopropyl phosphorothiate, thiocyclam, thiofanox, thiometon, tralomethrin, triflumuron, trimethacarb, vamidothion, Verticillium lacanii, XMC, xylylcarb, benfuracarb, bensultap, bifenthrin, bioallethrin, MERbioallethrin (S)-cyclopentenyl isomer, bromophos, bromophos-ethyl, buprofezin, cadusafos, calcium polysulphide, carbophenothion, cartap, quinomethionate, chlordane, chlorfenvinphos, chlorfluazuron, chlormephos, chloropicrin, chlorpyrifos, cyanophos, beta-cyfluthrin, alpha-cypermethrin, cyophenothrin, cyromazine, dazomet, DDT, demeton-S-methylsulphone, diafenthiuron, dialifos, dicrotophos, diflubenzuron, dinoseb, deoxabenzofos, diaxacarb, disulfoton, DNOC, empenthrin, endosulfan, EPN, esfenvalerate, ethiofencarb, ethion, etofenprox, fenobucarb, fenoxycarb, fensulfothion, spinosynen, flucycloxuron, flufenprox, flufenoxuron, fonofos, formetanate, formothion, fosmethilan, furathiocarb, heptachlor, hexaflumuron, hydramethylnon, hydrogen cyanide, hydroprene, IPSP, isazofos, isofenphos, isoprothiolane, isoxathion, iodfenphos, kadethrin, lindane, malathion, mecarbam, mephosfolan, mercurous chloride, metam, Metarthizium anisopliae, methacrifos, methamidophos, methidathion, methiocarb, methoprene, methoxychlor, methyl isothiocyanate, metholcarb, mevinphos, monocrotophos, naled, Neodiprion sertifer

NPV, nicotine, omethoate, oxydemeton-methyl, pentachlorophenol, petroleum oils, phenothrin, phenthoate, phorate.

The further insecticides which can be admixed, if appropriate, can also be from the class of the compounds of the general formula (I).

Preferred fungicides which may be admixed, if appropriate, are:

Triazoles, such as:

azaconazole, propiconazole, tebuconazole, cyproconazole, metaconazole, amitrole, azocyclotin, BAS 480F, bitertanol, difenoconazole, fenbuconazole, fenchlorazole, fenethanil, fluquinconazole, flusilazole, flutriafol, imibenconazole, isozofos, myclobutanil, paclobutrazol, (±)-cis-1-(4-chlorophenyl)-2-(1H-1,2,4-triazol-1-yl)-cycloheptanol, tetraconazole, triadimefon, triadimenol, triapenthenol, triflumizole, triticonazole, uniconazole and their metal salts and acid adducts.

Imidazoles, such as:

imazalil, pefurazoate, prochloraz, triflumizole, 2-(1-tert-butyl)-1-(2-chlorophenyl)-3-(1,2,4-triazol-1-yl)-propan-2-ol, thiazolecarboxanilides such as 2',6'-dibromo-2-methyl-4-trifluoromethoxy-4'-trifluoromethyl-1,3-thiazole-5-carboxanilide, 1-imidazolyl-1-(4'-chlorophenoxy)-3,3-dimethylbutan-2-one and their metal salts and acid adducts.

Methyl (E)-2-[2-[6-(2-cyanophenoxy)pyrimidin-4-yloxy]phenyl]3-methoxyacrylate, methyl (E)-2-[2-[6-(2-thioamidophenoxy)pyrimidin-4-yloxy]phenyl]-3-methoxyacrylate, methyl (E)-2-[2-[6-(2-fluorophenoxy)pyrimidin-4-yloxy]phenyl]-3-methoxyacrylate, methyl (E)-2-[2-[6-(2,6-difluorophenoxy)pyrimidin-4-yloxy]phenyl]-3-methoxyacrylate, methyl (E)-2-[2-[3-(pyrimidin-2-yloxy)phenoxy]phenyl]-3-methoxyacrylate, methyl (E)-2-[2-[3-(5-methylpyrimidin-2-yloxy)-phenoxy]phenyl]-3-methoxyacrylate, methyl (E)-2-[2-[3-(phenyl-sulphonyloxy)phenoxy]phenyl-3-methoxyacrylate, methyl (E)-2-[2-[3-(4-nitrophenoxy)phenoxy]phenyl]-3-methoxyacrylate, methyl (E)-2-[2-phenoxyphenyl]-3-methoxyacrylate, methyl (E)-2-[2-

(3,5-dimethylbenzoyl)pyrrol-1-yl]-3-methoxyacrylate, methyl (E)-2-[2-(3-methoxyphenoxy)phenyl]-3-methoxyacrylate, methyl (E)-2[2-(2-phenylethen-1-yl)-phenyl]-3-methoxyacrylate, methyl (E)-2-[2-(3,5-dichlorophenoxy)pyridin-3-yl]-3-methoxyacrylate, methyl (E)-2-(2-(3-(1,1,2,2-tetrafluoroethoxy)phenoxy)phenyl)-3-methoxyacrylate, methyl (E)-2-(2-[3-(alphahydroxybenzyl)phenoxy]phenyl)-3-methoxyacrylate, methyl (E)-2-(2-(4-phenoxypyridin-2-yloxy)phenyl)-3-methoxyacrylate, methyl (E)-2-[2-(3-n-propyloxyphenoxy)phenyl]3-methoxyacrylate, methyl (E)-2-[2-(3-isopropyloxyphenoxy)phenyl]-3-methoxyacrylate, methyl (E)-2-[2-[3-(2-fluorophenoxy)phenoxy]phenyl]-3-methoxyacrylate, methyl (E)-2-[2-(3-ethoxyphenoxy)phenyl]-3-methoxyacrylate, methyl (E)-2-[2-(4-tert-butylpyridin-2-yloxy)phenyl]-3-methoxyacrylate, methyl (E)-2-[2-[3-(3-cyanophenoxy)phenoxy]phenyl]-3-methoxyacrylate, methyl (E)-2-[2-(3-methylpyridin-2-yloxymethyl)phenyl]-3-methoxyacrylate, methyl (E)-2-[2-[6-(2-methylphenoxy)pyrimidin-4-yloxy]phenyl]-3-methoxyacrylate, methyl (E)-2-[2-(5-bromopyridin-2-yloxymethyl)phenyl]-3-methoxyacrylate, methyl (E)-2-[2-(3-(3-iodopyridin-2-yloxy)phenoxy)phenyl]-3-methoxyacrylate, methyl (E)-2-[2-[6-(2-chloropyridin-3-yloxy)pyrimidin-4-yloxy]phenyl]-3-methoxyacrylate, methyl (E),(E)-2-[2-(5,6-dimethylpyrazin-2-ylmethoximinomethyl)phenyl]-3-methoxyacrylate, methyl (E)-2-{2-[6-(6-methylpyridin-2-yloxy)pyrimidin-4-yloxy]phenyl}-3-methoxyacrylate, methyl (E),(E)-2-{2-(3-methoxyphenyl)methyloximinomethyl]phenyl}-3-methoxyacrylate, methyl (E)-2-{2-(6-(2-azidophenoxy)-pyrimidin-4-yloxy]phenyl}-3-methoxyacrylate, methyl (E),(E)-2-{2-[6-phenylpyrimidin-4-yl)-methyloximinomethyl]phenyl}-3-methoxyacrylate, methyl (E),(E)-2-{2-[(4-chlorophenyl)-methyloximinomethyl]phenyl}-3-methoxyacrylate, methyl (E)-2-{2-[6-(2-n-propylphenoxy)-1,3,5-triazin-4-yloxy]phenyl}-3-methoxyacrylate, methyl (E),(E)-2-{2-[(3-nitrophenyl)methyloximinomethyl]phenyl}-3-methoxyacrylate;

succinate dehydrogenase inhibitors such as:

fenfuram, furcarbanil, cyclafluramid, furmecyclox, seedvax, metsulfovax, pyrocarbolid, oxycarboxin, shirlan, mebenil (mepronil), benodanil, flutolanil (Moncut);

naphthalene derivatives such as terbinafine, naftifine, butenafine, 3-chloro-7-(2-aza-2,7,7-trimethyl-oct-3-en-5-ine);

sulfenamides, such as dichlofluanid, tolylfluanid, folpet, fluorfolpet; captan, captofol;

benzimidazoles, such as carbendazim, benomyl, furathiocarb, fuberidazole, thiophonatmethyl, thiabendazole or their salts;

morpholine derivatives, such as fenpropimorph, falimorph, dimethomorph, dodemorph; aldimorph, fenpropidine and their arylsulphonates, such as, for example, p-toluenesulphonic acid and p-dodecylphenylsulphonic acid;

dithiocarbamates, cufraneb, ferbam, mancopper, mancozeb, maneb, metam, metiram, thiram zeneb, ziram:

benzothiazoles, such as 2-mercaptobenzothiazole;

benzamides, such as 2,6-dichloro-N-(4-trifluoromethylbenzyl)-benzamide;

boron compounds, such as boric acid, boric esters, borax;

formaldehyde and formaldehyde-releasing compounds, such as benzyl alcohol mono(poly)-hemiformal, oxazolidine, hexa-hydro-S-triazines, N-methylolchloroacetamide, paraformadehyde, nitropyrin, oxolinic acid, tecloftalam;

tris-N-(cyclohexyldiazeneiumdioxy)-aluminium, N-(cyclohexyldiazeneiumdioxy)-tributyltin or K salts, bis-N-(cyclohexyldiazeniumdioxy)-copper;

N-methylisothiazolin-3-one, 5-chloro-N-methylisothiazolin-3-one, 4,5-dichloro-N-octylisothiazolin-3-one, N-octyl-isothiazolin-3-one, 4,5-trimethylene-isothiazolinone, 4,5-benzoisothiazolinone, N-methylolchloroacetamide;

aldehydes, such as cinnamaldehyde, formaldehyde, glutaraldehyde, β-bromocinnamaldehyde; thiocyanates, such as thiocyanatomethylthiobenzothiazole, methylenebisthiocyanate, and the like;

quaternary ammonium compounds, such as benzyldimethyltetradecylammonium chloride, benzyldimethyldodecylammonium chloride, didecyldimethylammonium chloride;

iodine derivatives, such as diiodomethyl p-tolyl sulphone, 3-iodo-2-propinyl alcohol, 4-chlorophenyl-3-iodopropargyl formal, 3-bromo-2,3-diiodo-2-propenyl ethylcarbamate, 2,3,3-triiodoallyl alcohol, 3-bromo-2,3-diiodo-2-propenyl alcohol, 3-iodo-2-propinyl n-

butylcarbamate, 3-iodo-2-propinyl n-hexylcarbamate, 3-iodo-2-propinyl cyclohexyl-carbamate, 3-iodo-2-propinyl phenylcarbamate;

phenol derivatives, such as tribromophenol, tetrachlorophenol, 3-methyl-4-chlorophenol, 3,5-dimethyl-4-chlorophenol, phenoxyethanol, dichlorophene, o-phenylphenol, m-phenylphenol, p-phenylphenol, 2-benzyl-4-chlorophenol and their alkali metal and alkaline earth metal salts;

microbicides having an activated halogen group, such as chloroacetamide, bronopol, bronidox, tectamer, such as 2-bromo-2-nitro-1,3-propanediol, 2-bromo-4'-hydroxy-acetophenone, 2,2-dibromo-3-nitrile-propionamide, 1,2-dibromo-2,4-dicyanobutane, β-bromo-β-nitrostyrene;

pyridines, such as 1-hydroxy-2-pyridinethione (and their Na, Fe, Mn, Zn salts), tetrachloro-4-methylsulphonylpyridine, pyrimethanol, mepanipyrim, dipyrithion, 1-hydroxy-4-methyl-6-(2,4,4-trimethylpentyl)-2(1H)-pyridine;

metal soaps, such as copper hydroxycarbonate, copper sulphate, copper chloride, tin naphtenate, copper naphtenate, zinc naphtenate, tin octoate, copper octoate, zinc octoate, tin 2-ethylhexanoate, copper 2-ethylhexanoate, zinc 2-ethylhexanoate, tin oleate, copper oleate, zinc oleate, tin phosphate, copper phosphate, zinc phosphate, tin benzoate, copper benzoate and zinc benzoate;

metal salts, such as copper hydroxycarbonate, sodium dichromate, potassium dichromate, potassium chromate, copper sulphate, copper chloride, copper borate, zinc fluorosilicate, copper fluorosilicate, in particular mixtures with fixing agents;

oxides, such as tributyltin oxide, Cu_2O, CuO, ZnO;

dialkyldithiocarbamates, such as Na and Zn salts of dialkyldithiocarbamates, tetramethylthiuram disulphide, potassium N-methyl-dithiocarbamate;

nitriles, such as 2,4,5,6-tetrachloroisophthalonitrile, disodium cyano-dithioimidocarbamate;

quinolines, such as 8-hydroxyquinoline, and their Cu salts;

mucochloric acid, 5-hydroxy-2(5H)-furanone;

4,5-dichlorodithiazolinone, 4,5-benzodithiazolinone, 4,5-trimethylenedithiazolinone, 4,5-dichloro-(3H)-1,2-dithiol-3-one, 3,5-dimethyl-tetrahydro-1,3,5-thiadiazine-2-

thione, N-(2-p-chlorobenzoylethyl)-hexaminium chloride, potassium N-hydroxymethyl-N'-methyl-dithiocarbamate,
2-oxo-2-(4-hydroxy-phenyl)acethydroximic acid chloride,
phenyl 2-chloro-cyano-vinyl sulphone,
phenyl 1,2-dichloro-2-cyano-vinyl sulphone;
Ag, Zn or Cu-containing zeolites, alone or enclosed in polymeric active compounds. or else mixtures of a plurality of the abovementioned fungicides.

The active compound content of the use forms prepared from the commercially available formulations can vary within wide limits. The active compound concentration of the use forms can be from 0.0000001 to 95% by weight of active compound, preferably between 0.0001 and 1% by weight.

The active compound mixtures can be converted into the customary formulations, such as solutions, emulsions, suspensions, powders, foams, pastes, granules, aerosols, active-compound-impregnated natural and synthetic materials, very fine encapsulations in polymeric substances and in coating compositions for seed, furthermore into formulations with smokes, such as fumigating cartridges, fumigating cans, fumigating coils and the like, and also ULV cold mist and warm mist formulations.

These formulations are prepared in a known manner, for example by mixing the active compounds with extenders, that is liquid solvents, pressurized liquefied gases and/or solid carriers, optionally with the use of surfactants, that is emulsifiers and/or dispersing agents, and/or foam-formers. If the extender used is water, it is also possible to use for example organic solvents as auxiliary solvents. Suitable liquid solvents are essentially: aromatics, such as xylene, toluene or alkylnaphthalenes, chlorinated aromatics or chlorinated aliphatic hydrocarbons, such as chlorobenzenes, chloroethylenes or methylene chloride, aliphatic hydrocarbons, such as cyclohexane or paraffins, for example mineral oil fractions, alcohols, such as butanol or glycol and also their ethers and esters, ketones, such as acetone, methyl ethyl ketone, methyl isobutyl ketone or cyclohexanone, strongly polar solvents, such as dimethylformamide and

dimethyl sulphoxide, and also water; by liquefied gaseous extenders or carriers are meant liquids which are gaseous at ambient temperature and under atmospheric pressure, for example aerosol propellant, such as halogenated hydrocarbons and also butane, propane, nitrogen and carbon dioxide; suitable solid carriers are: for example, ground natural minerals, such as kaolins, clays, talc, chalk, quartz, attapulgite, montmorillonite or diatomaceous earth, and ground synthetic minerals, such as finely divided silica, alumina and silicates; suitable solid carriers for granules are: for example, crushed and fractionated natural rocks such as calcite, marble, pumice, sepiolite and dolomite, and also synthetic granules of inorganic and organic meals, and granules of organic material such as sawdust, coconut shells, maize cobs and tobacco stalks; suitable emulsifiers and/or foam-formers are: for example, nonionic and anionic emulsifiers, such as polyoxyethylene fatty acid esters, polyoxyethylene fatty alcohol ethers, for example alkylaryl polyglycol ethers, alkylsulphonates, alkyl sulphates, arylsulphonates and also protein hydrolysates; suitable dispersing agents are: for example, lignin-sulphite waste liquors and methylcellulose.

Tackifiers such as carboxy-methylcellulose and natural and synthetic polymers in the form of powders, granules or latices, such as gum arabic, polyvinyl alcohol and polyvinyl acetate, and also natural phospholipids, such as cephalins and lecithins, and synthetic phospholipids, can be used in the formulations. Other possible additives are mineral and vegetable oils.

It is possible to use colorants such as inorganic pigments, for example iron oxide, titanium oxide and Prussian Blue, and organic dyestuffs, such as alizarin dyestuffs, azo dyestuffs and metal phthalocyanine dyestuffs, and trace nutrients such as salts of iron, manganese, boron, copper, cobalt, molybdenum and zinc.

The formulations in general comprise between 0.1 and 95 per cent by weight of active compound mixture, preferably between 0.5 and 90 per cent by weight of active compound mixture.

The mixtures according to the invention can be applied via the leaves.

According to the invention, it is possible to treat all plants and parts of plants. By plants are to be understood here all plants and plant populations such as desired and undesired wild plants or crop plants (including naturally occurring crop plants). Crop plants can be plants which can be obtained by conventional breeding and optimization methods or by biotechnological and genetic engineering methods or combinations of these methods, including transgenic plants and including plant cultivars which can or cannot be protected by plant breeder certificates. Parts of plants are to be understood as meaning all above-ground and below-ground parts and organs of plants, such as shoot, leaf, flower and root, examples which may be mentioned being leaves, needles, stems, trunks, flowers, fruit bodies, fruits and seeds and also roots, tubers and rhizomes. Parts of plants also include harvested plants and vegetative and generative propagation material, for example seedlings, tubers, rhizomes, cuttings and seeds.

The treatment of the plants and parts of plants according to the invention with the active compounds is carried out directly or by action on their environment, habitat or storage area according to customary treatment methods, for example by dipping, spraying, evaporating, atomizing, broadcasting, brushing-on and, in the case of propagation material, in particular in the case of seeds, furthermore by one- or multi-layer coating.

When using the active compound combinations according to the invention, the application rates can be varied within a relatively wide range, depending on the type of application. In the treatment of parts of plants, the active compound combination application rates are generally between 0.1 and 10,000 g/ha, preferably between 10 and 1000 g/ha.

The good insecticidal and acaricidal action of the active compound combinations according to the invention is evident from the examples below. While the individual

active compounds exhibit weaknesses with regard to the activity, the combinations have an activity which exceeds a simple addition of activities.

A synergistic effect of insecticides and acaricides is always present when the activity of the active compound combinations exceeds the total of the activities of the active compounds when applied individually.

The expected activity for a given combination of two active compounds can be calculated as follows (after S.R. Colby, Weeds 15 (1967), 20-22):

If

X is the efficacy when applying the active compound A at an application rate of m g/ha or in a concentration of m ppm,

Y is the efficacy when applying the active compound B at an application rate of n g/ha or at a concentration of n ppm and

E is the efficacy when applying the active compounds A and B at application rates of m and n g/ha or at a concentration of m and n ppm,

then

$$E = X + Y - \frac{X \cdot Y}{100}$$

The efficacy is calculated in %. 0% is an efficacy which corresponds to that of the control, whereas an efficacy of 100% means that no infection is observed.

If the actual activity exceeds the calculated value, then the activity of the combination is superadditive, i.e. a synergistic effect exists. In this case, the efficacy which was

actually observed must be greater than the value for the expected efficacy (E) calculated from the abovementioned formula.

Example A

Aphis gossypii test

Solvent: 3 parts by weight of dimethylformamide

Emulsifier: 1 part by weight of alkylaryl polyglycol ether

To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amounts of solvent and emulsifier, and the concentrate is diluted with water to the desired concentrations.

Cotton leaves (Gossypium hirsutum) which are heavily infested by the cotton aphid (Aphis gossypii) are treated by being dipped into the preparation of active compound of the desired concentration.

After the desired period of time, the kill in % is determined. 100% means that all aphids have been killed; 0% means that none of the aphids have been killed. The kill rates that are determined are assessed using Colby's formula.

In this test, for example, the following active compound combination according to the present application exhibits a synergistically enhanced activity compared with the active compounds applied individually:

Table A Sheet 1

plant-damaging insects

Aphis gossypii test

Active compounds	Active compound concentration in ppm	Kill rates in % after 6d	
Ex. (Ia) known	1.6	0	
Ex. (IIa) known	1.6	85	
Ex. (Ia) + Ex. (IIa) according to the invention	1.6 + 1.6	found* 95	calc.** 85

found* = activity found

calc.** = activity calculated using Colby's formula

Table A Sheet 2

plant-damaging insects

Aphis gossypii test

Active compounds	Active compound concentration in ppm	Kill rate in % after 6d	
Ex. (Ia) known	1.6	0	
Ex. (IIk) known	1.6	55	
Ex. (Ia) + Ex. (IIk) according to the invention	1.6 + 1.6	found*	calc.**
		95	55

found* = activity found

calc.** = activity calculated using Colby's formula

Example B

Aphis gossypii test/larval mortality

Solvent:	3	parts by weight of dimethylformamide
Emulsifier:	1	part by weight of alkylaryl polyglycol ether

To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amounts of solvent and emulsifier, and the concentrate is diluted with water to the desired concentrations.

Cotton leaves (Gossypium hirsutum) which are heavily infested by adults and larvae of the cotton aphid (Aphis gossypii) are treated by being dipped into the preparation of active compound of the desired concentration.

After the desired period of time, the kill of larvae in % is determined. 100% means that all larvae have been killed; 0% means that none of the larvae have been killed. The kill rates that are determined are assessed using Colby's formula.

In this test, for example, the following active compound combination according to the present application exhibits a synergistically enhanced activity compared with the active compounds applied individually:

Table B Sheet 1

plant-damaging insects

Aphis gossypii test/larval mortality

Active compounds	Active compound concentration in ppm	Kill rate in % after 6d	
Ex. (Ia) known	1.6	0	
Ex. (IIa) known	1.6	80	
Ex. (Ia) + Ex. (IIa) according to the invention	1.6 + 1.6	found*	calc.**
		95	80

found* = activity found

calc.** = activity calculated using Colby's formula

Table B Sheet 2

plant-damaging insects

Aphis gossypii test/larval mortality

Active compounds	Active compound concentration in ppm	Kill rate in % after 6d	
Ex. (Ia) Known	1.6	0	
Ex. (IIk) Known	1.6	60	
Ex. (Ia) + Ex. (IIk) according to the invention	1.6 + 1.6	found* 95	calc.** 60

found* = activity found

calc.** = activity calculated using Colby's formula

Example C

Myzus test

	Solvent:	3 parts by weight of dimethylformamide
5	Emulsifier:	1 part by weight of alkylaryl polyglycol ether

To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amounts of solvent and emulsifier, and the concentrate is diluted with water to the desired concentrations.

10

Cabbage leaves (Brassica oleracea) which are heavily infested by the peach aphid (Myzus persicae) are treated by being dipped into the preparation of active compound of the desired concentration.

15 After the desired period of time, the kill in % is determined. 100% means that all animals have been killed; 0% means that none of the animals have been killed. The kill rates determined are assessed using Colby's formula.

In this test, for example, the following active compound combination according to
20 the present application exhibits a synergistically enhanced activity compared with the active compounds applied individually:

Table C

plant-damaging insects

Myzus test

Active compounds	Active compound concentration in ppm	Kill rates in % after 1d	
Ex. (Ia) Known	1.6	0	
Ex. (IIa) Known	1.6	70	
Ex. (Ia) + Ex. (IIa) according to the invention	1.6 + 1.6	found* 98	calc.** 70

found* = activity found

calc.** = activity calculated using Colby's formula

Example D

Myzus test/larval mortality

Solvent: 3 parts by weight of dimethylformamide

Emulsifier: 1 part by weight of alkylaryl polyglycol ether

To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amounts of solvent and emulsifier, and the concentrate is diluted with water to the desired concentrations.

Cabbage leaves (Brassica oleracea) which are heavily infested by adults and larvae of the peach aphid (Myzus persicae) are treated by being dipped into the preparation of active compound of the desired concentration.

After the desired period of time, the kill of the larvae in % is determined. 100% means that all larvae have been killed; 0% means that none of the larvae have been killed. The kill rates determined are assessed using Colby's formula.

In this test, for example, the following active compound combination according to the present application exhibits a synergistically enhanced activity compared with the active compounds applied individually:

Table D

plant-damaging insects

Myzus test/larval mortality

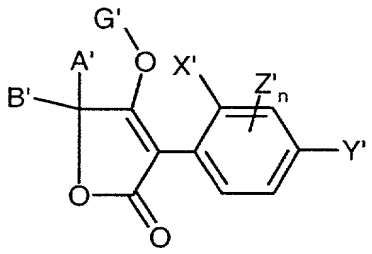
Active compounds	Active compound concentration in ppm	Kill rates in % after 1d	
Ex. (Ia) Known	0.32	0	
Ex. (IIa) Known	0.32	0	
Ex. (Ia) + Ex. (IIa) according to the invention	0.32 + 0.32	found* 55	calc.** 0

found* = activity found

calc.** = activity calculated using Colby's formula

Patent claims

1. Composition, comprising a synergistically effective mixture of compounds of the formula (I)



(I)

in which

X' represents C_1-C_6-alkyl, halogen, C_1-C_6-alkoxy or C_1-C_3-halogenoalkyl,

Y' represents hydrogen, C_1-C_6-alkyl, halogen, C_1-C_6-alkoxy, C_1-C_3-halogenoalkyl,

Z' represents C_1-C_6-alkyl, halogen, C_1-C_6-alkoxy,

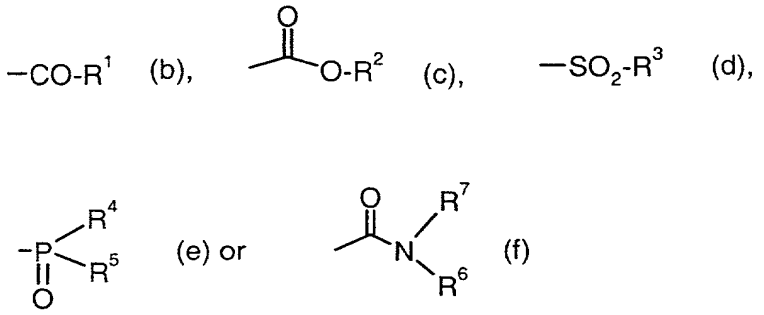
n represents a number from 0 to 3,

A' and B' are identical or different and each represents hydrogen or in each case optionally halogen-substituted straight-chain or branched C_1-C_{12}-alkyl, C_3-C_8-alkenyl, C_3-C_8-alkinyl, C_1-C_{10}-alkoxy-C_2-C_8-alkyl, C_1-C_8-polyalkoxy-C_2-C_8-alkyl, C_1-C_{10}-alkylthio-C_2-C_8-alkyl, cycloalkyl having 3-8 ring atoms which may be interrupted by oxygen and/or sulphur and in each case optionally halogen-, C_1-C_6-alkyl-, C_1-C_6-halogenoalkyl-, C_1-C_6-alkoxy-, C_1-C_6-halogenoalkoxy- and/or nitro-substituted phenyl or phenyl-C_1-C_6-alkyl,

or in which

A' and B' together with the carbon atom to which they are attached form a saturated or unsaturated 3- to 8-membered ring which is optionally interrupted by oxygen and/or sulphur and is optionally substituted by halogen, C_1-C_6-alkyl, C_1-C_6-alkoxy, C_1-C_4-halogenoalkyl, C_1-C_4-halogenoalkoxy, C_1-C_4-alkylthio or optionally substituted phenyl or is optionally benzo-fused,

G' represents hydrogen (a) or represents the groups



in which

R^1 represents in each case optionally halogen-substituted C_1-C_{20}-alkyl, C_2-C_{20}-alkenyl, C_1-C_8-alkoxy-C_2-C_8-alkyl, C_1-C_8-alkylthio-C_2-C_8-alkyl, C_1-C_8-polyalkoxy-C_2-C_8-alkyl or cycloalkyl having 3-8 ring members which may be interrupted by oxygen and/or sulphur atoms,

represents optionally halogen-, nitro-, C_1-C_6-alkyl-, C_1-C_6-alkoxy-, C_1-C_6-halogenoalkyl- and/or C_1-C_6-halogenoalkoxy-substituted phenyl;

represents optionally halogen-, C_1-C_6-alkyl-, C_1-C_6-alkoxy-, C_1-C_6-halogenoalkyl- and/or C_1-C_6-halogenoalkoxy-substituted phenyl-C_1-C_6-alkyl,

represents in each case optionally halogen- and/or C_1-C_6-alkyl-substituted pyridyl, pyrimidyl, thiazolyl and pyrazolyl,

or represents optionally halogen- and/or C_1-C_6-alkyl-substituted phenoxy-C_1-C_6-alkyl,

R^2 represents in each case optionally halogen-substituted C_1-C_{20}-alkyl, C_2-C_{20}-alkenyl, C_1-C_8-alkoxy-C_2-C_8-alkyl, C_1-C_8-polyalkoxy-C_2-C_8-alkyl,

represents in each case optionally halogen-, nitro-, C_1-C_6-alkyl, C_1-C_6-alkoxy- and/or C_1-C_6-halogenoalkyl-substituted phenyl or benzyl,

R^3, R^4 and R^5 independently of one another each represent in each case optionally halogen-substituted C_1-C_8-alkyl, C_1-C_8-alkoxy, C_1-C_8-alkylamino, di-(C_1-C_8)-alkylamino, C_1-C_8-alkylthio, C_2-C_5-alkenylthio, C_2-C_5-alkinylthio, C_3-C_7-cycloalkylthio, represent in each case optionally halogen-, nitro-, cyano-, C_1-C_4-alkoxy-, C_1-C_4-halogenoalkoxy-, C_1-C_4-alkylthio-, C_1-C_4-halogenoalkylthio-, C_1-C_4-alkyl- and/or C_1-C_4-halogenoalkyl-substituted phenyl, phenoxy or phenylthio,

R^6 and R^7 independently of one another each represent in each case optionally halogen-substituted C_1-C_{20}-alkyl, C_1-C_{20}-alkoxy, C_2-C_8-alkenyl, C_1-C_{20}-alkoxy-C_1-C_{20}-alkyl, represent optionally halogen-, C_1-C_{20}-halogenoalkyl-, C_1-C_{20}-alkyl- or C_1-C_{20}-alkoxy-substituted

phenyl, represent optionally halogen-, C_1-C_{20}-alkyl-, C_1-C_{20}-halogenoalkyl- or C_1-C_{20}-alkoxy-substituted benzyl or together represent a C_2-C_6-alkylene ring which is optionally interrupted by oxygen,

and at least one agonist or antagonist of nicotinic acetylcholine receptors.

2. Composition, comprising a synergistically effective mixture of compounds of the formula (I) according to Claim 1,

in which

X' represents C_1-C_4-alkyl, halogen, C_1-C_4-alkoxy or C_1-C_2-halogenoalkyl,

Y' represents hydrogen, C_1-C_4-alkyl, halogen, C_1-C_4-alkoxy, C_1-C_2-halogenoalkyl,

Z' represents C_1-C_4-alkyl, halogen, C_1-C_4-alkoxy,

n represents 0 or 1,

A' and B' together with the carbon atom to which they are attached form a saturated 5- to 6-membered ring which is optionally substituted by C_1-C_4-alkyl and/or C_1-C_4-alkoxy,

G' represents hydrogen (a) or represents the groups

in which

R^1 represents in each case optionally halogen-substituted C_1-C_{16}-alkyl, C_2-C_{16}-alkenyl, C_1-C_6-alkoxy-C_2-C_6-alkyl or cycloalkyl having 3-7 ring atoms which may be interrupted by 1 to 2 oxygen and/or sulphur atoms,

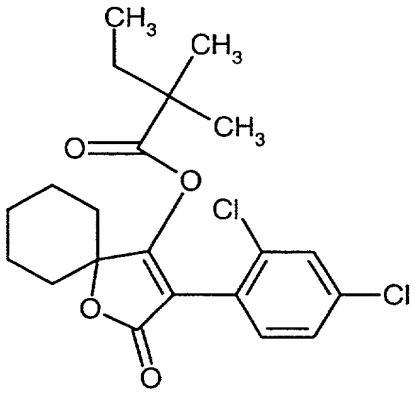
represents optionally halogen-, nitro-, C_1-C_4-alkyl-, C_1-C_4-alkoxy-, C_1-C_3-halogenoalkyl- and/or C_1-C_3-halogenoalkoxy-substituted phenyl;

R^2 represents in each case optionally halogen-substituted C_1-C_{16}-alkyl, C_2-C_{16}-alkenyl or C_1-C_6-alkoxy-C_2-C_6-alkyl,

represents in each optionally halogen-, nitro-, C_1-C_4-alkyl-, C_1-C_4-alkoxy- and/or C_1-C_4-halogenoalkyl-substituted phenyl or benzyl,

and at least one agonist or antagonist of nicotinic acetylcholine receptors.

3. Composition, comprising a synergistically effective mixture of the compound of the formula (Ia)



(Ia)

and at least one agonist or antagonist of nicotinic acetylcholine receptors.

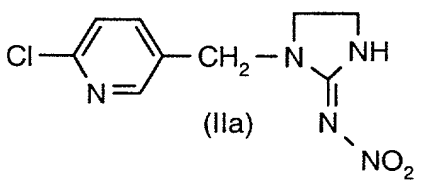
4. Composition according to any of Claims 1, 2 and 3, comprising compounds of the formula (I) and the agonist or antagonist of nicotinic acetylcholine receptors in a ratio of from 1:100 to 100:1.

5. Use of a synergistically effective mixture, comprising compounds of the formula (I) according to any of Claims 1, 2 and 3, and at least one agonist or antagonist of nicotinic acetylcholine receptors, for controlling animal pests.

6. Method for controlling animal pests, characterized in that mixtures as defined in any of Claims 1, 2 and 3 are allowed to act on animal pests and/or their habitat.

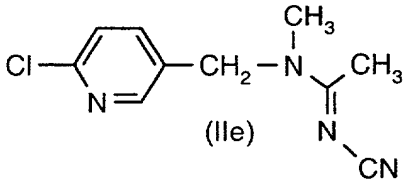
7. Process for preparing pesticides, characterized in that a synergistially effective amount comprising compounds of the formula (I) according to any of Claims 1, 2 and 3 and at least one agonist or antagonist of nicotinic acetylcholine receptors is mixed with extenders and/or surfactants.

8. Mixtures according to any of Claims 1, 2, 3 and 4, comprising at least one of the following compounds



(IIa)

or



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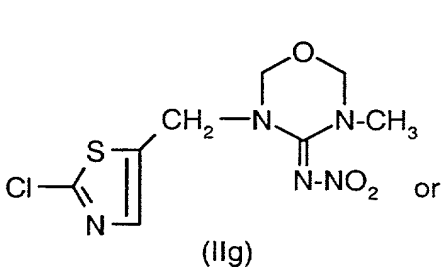
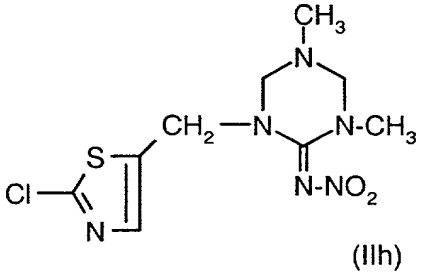


(IIg)

or



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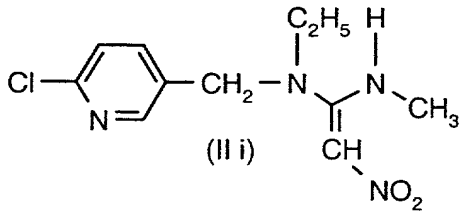
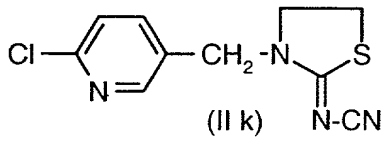
or



(II i)

or



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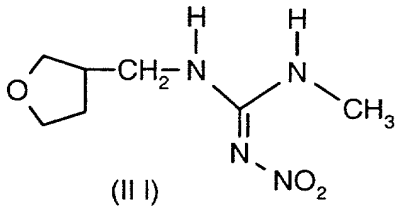

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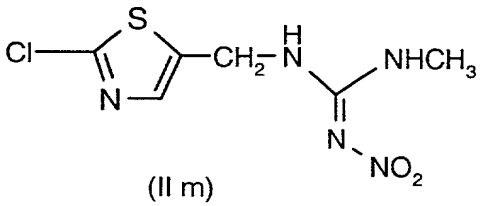

(II m)

 10/089989

Active compound combinations having insecticidal and acaricidal properties

Abstract

The invention relates to insecticidal and acaricidal mixtures comprising certain cyclic ketoenols and agonists or antagonists of nicotinic acetylcholine receptors for protecting plants against attack by pests.

COMBINED DECLARATION AND POWER OF ATTORNEY	ATTORNEY DOCKET NO

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name. I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought
on the invention entitled

ACTIVE INGREDIENT COMBINATIONS HAVING INSECTICIDAL AND ACARICIDAL PROPERTIES

the specification of which is attached hereto,

or was filed on **September 25, 2000**

as a PCT Application Serial No. **PCT/EP00/09323**

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s), the priority(ies) of which is/are to be claimed:

199 48 129.6	**Germany**	**October 7, 1999**
(Number)	(Country)	(Month/Day/Year Filed)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose the material information as defined in Title 37, Code of Federal Regulations, §1.56 which occured between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

(15)

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RESIDENCE		CITIZENSHIP
POST OFFICE ADDRESS		
FULL NAME OF FIFTH INVENTOR	INVENTOR'S SIGNATURE	DATE
RESIDENCE		CITIZENSHIP
POST OFFICE ADDRESS		
FULL NAME OF SIXTH INVENTOR	INVENTOR'S SIGNATURE	DATE
RESIDENCE		CITIZENSHIP
POST OFFICE ADDRESS		
FULL NAME OF SEVENTH INVENTOR	INVENTOR'S SIGNATURE	DATE
RESIDENCE		CITIZENSHIP
POST OFFICE ADDRESS		